CPU Cards

CPGT & CPGU Series

PICMG SBCs with VGA, LAN, DVI*,SATA, USB, and Audio

CPGx C2-24-X: 2.4GHz Core 2 Duo Processor

CPGx P4-32-X: 3.2GHz Pentium 4 Processor

CPGx PD-32-24: 3.4GHz Pentium D Processor

CPGx PD-36-X: 3.6GHz Pentium D Processor

* CPGU models only

RoHS compliant

USER'S MANUAL

VER. 1.0 • DEC 2006

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Revision History

Model Name	**CPGx Series**	
Revision Number	**Description**	**Date of Issue**
1.0	Initial release	December 2006

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Glossary

AC ’97	Audio Codec 97
ACPI	Advanced Configuration and Power Interface
APM	Advanced Power Management
ARMD	ATAPI Removable Media Device
ASKIR	Amplitude Shift Keyed Infrared
ATA	Advanced Technology Attachments
BIOS	Basic Input/Output System
CFII	CompactFlash® Type 2
CMOS	Complementary Metal Oxide Semiconductor
CPU	Central Processing Unit
Codec	Compressor/Decompressor
COM	Serial Port
DAC	Digital to Analog Converter
DDR	Double Data Rate
DIMM	Dual Inline Memory Module
DIO	Digital Input/Output
DMA	Direct Memory Access
EIDE	Enhanced IDE
EIST	Enhanced Intel SpeedStep® Technology
FDD	Floppy Disk Drive
FDC	Floppy Disk Connector
FFIO	Flexible File Input/Output
FIFO	First In/First Out
FSB	Front Side Bus
IrDA	Infrared Data Association
HDD	Hard Disk Drive
IDE	Integrated Data Electronics
I/O	Input/Output
ICH4	I/O Controller Hub 4
L1 Cache	Level 1 Cache
L2 Cache	Level 2 Cache
LCD	Liquid Crystal Display
LPT	Parallel Port Connector
LVDS	Low Voltage Differential Signaling
MAC	Media Access Controller
OS	Operating System
PCI	Peripheral Connect Interface
PIO	Programmed Input Output
PnP	Plug and Play
POST	Power On Self Test
RAM	Random Access Memory
SATA	Serial ATA
S.M.A.R.T	Self Monitoring Analysis and Reporting Technology
SPD	Serial Presence Detect
S/PDI	Sony/Philips Digital Interface
SDRAM	Synchronous Dynamic Random Access Memory
SIR	Serial Infrared
UART	Universal Asynchronous Receiver-transmitter
USB	Universal Serial Bus
VGA	Video Graphics Adapter

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Chapter

1

Introduction

1.1 CPGx Series CPU Card Overview

The PICMG 1.0 form factor CPGx Series CPU card with Intel® Pentium® D processor platform is fully equipped with the latest technology and advanced multi-mode I/Os. The

1.1.1 CPGx Series Model Variations

The CPGx Series has two model variations shown in **Table 1-1:**.

Model Name	SATA II	Digital Video Interface (DVI)
CPGT Series	Four	None
CPGU Series	Four	One

Table 1-1: CPGx Series Model Variations

1.1.2 CPGx Series CPU Card Applications

The CPGx Series CPU cards have been designed for use in industrial applications where board expansion is critical and operational reliability is essential.

1.1.3 CPGx Series CPU Card Benefits

Some of the CPGx Series CPU card benefits include:

- Dual-core Intel® processor support
  - Two physical cores in a package share the system load
  - Each core has its own L1 cache and shares the L2 cache to enhance the processing speed
  - High performance levels especially in 3D graphic and multimedia application
- Enhanced Intel SpeedStep® Technology support ensures better power consumption management

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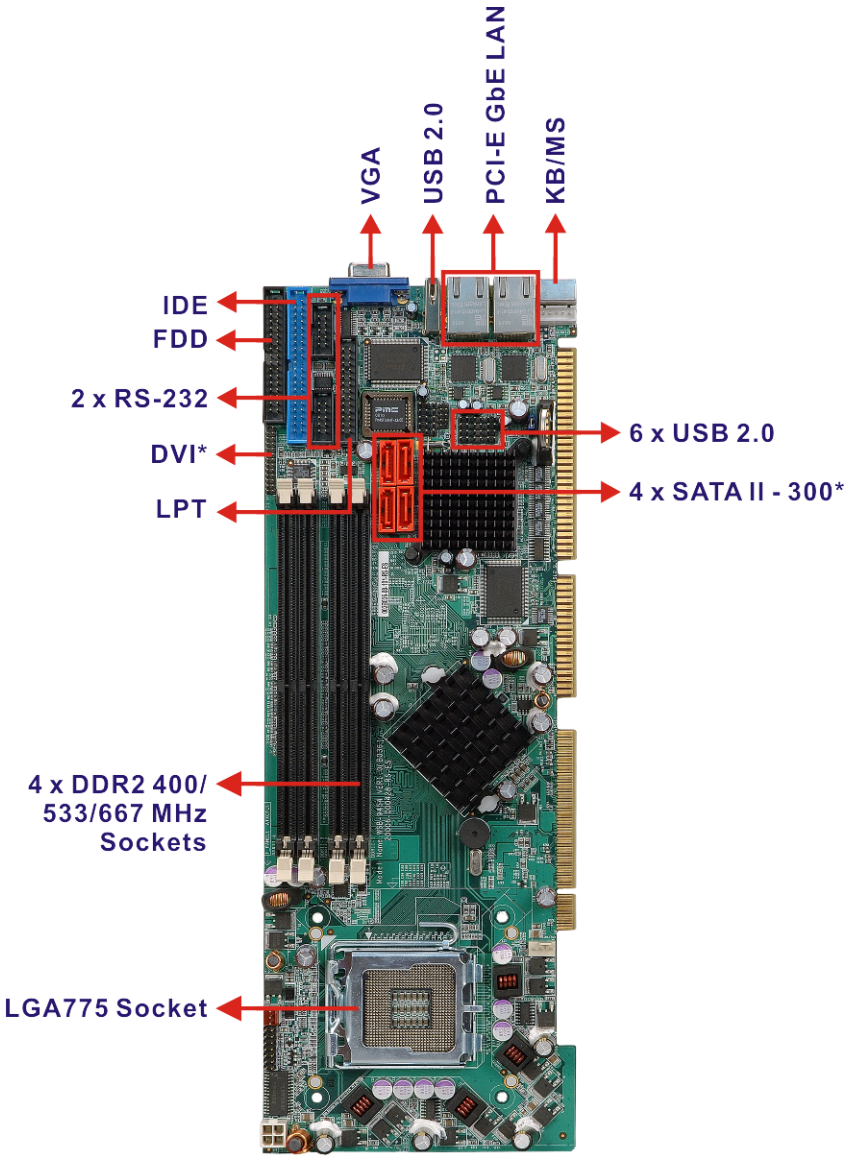
- Intel® EMT64 Technology supports 64-bit computing for improved performance, allowing systems to address more than 4GB of both virtual and physical memory
- providing access to multiple PCI and ISA expansion slots for easy system expansion
- operating reliably in harsh industrial environments with ambient temperatures as high as 60°C
- rebooting automatically if the BIOS watchdog timer detects that the system is no longer operating

1.1.4 CPGx Series CPU Card Features

Some of the CPGx Series CPU card features are listed below:

- PICMG 1.0 compliant
- RoHS compliant
- Supports Intel® Core™2 Duo / Pentium® 4 / Pentium® D / Celeron® D CPUs
- Supports a maximum front side bus (FSB) speed up to 1066MHz
- Supports up to 4GB of 400/533/667MHz of DDR2 memory
- Comes with two high performance PCI Express Gigabit Ethernet (PCI-E GbE) controllers
- Supports SATA II channels with transfer rates up to 300Mb/s (see **Table 1-1:**)
- Supports up to seven USB 2.0 devices
- Analog display supported
- One DVI interface with resolution from VGA to UXGA supported CPGU Series only (see **Table 1-1:**)

1.2 CPGx Series CPU Card Overview



*** See Table 1-1: for model variations CPGU shown here.**

Table 1-2: CPGx Series CPU Card Overview

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1.2.1 CPGx Series CPU Card Connectors

The CPGx Series CPU card has the following connectors on-board:

- 1 x ATX-12V connector
- 1 x Audio module connector
- 1 x Backplane to mainboard power connector
- 1 x CPU fan connector
- 4 x DDR2 DIMM sockets
- 1 x Digital I/O connector
- 1 x Digital Visual Interface (DVI) Connector (see **Table 1-1:**)
- 1 x FDD connector
- 1 x Front panel connector
- 1 x 40-pin IDE connector
- 1 x IrDA connector
- 1 x Keyboard/mouse connector
- 1 x Parallel port connector
- 2 x RS-232 Serial port connectors
- 4 x SATA II connectors (see **Table 1-1:**)
- 6 x USB connectors

The location of these connectors on the CPU card can be seen in **Figure 1-1**. These connectors are fully described in **Chapter 3**.

1.2.2 Technical Specifications

CPGx Series CPU card technical specifications are listed in **Table 1-3:**. Detailed descriptions of each specification can be found in **Chapter 2**.

SPECIFICATION	DESCRIPTION
Supported CPUs	Intel® Core™2 Duo Intel® Pentium® 4 Intel® Pentium® D Intel® Celeron® D
Front Side Bus	533/800/1066MHz
Socket	LGA775
Chipsets	Northbridge: Intel® 945G Express Chipset ○ Intel® 82945G Graphics and Memory Controller Hub (GMCH) Southbridge: Intel® ICH7 I/O Controller Hub (ICH)
Graphics Support	Intel® Graphics Media Accelerator 950 (GMA 950) integrated in the Northbridge ○ One VGA Silicon Image SiI1362 ○ One DVI (See **Table 1-1:**)
Memory	Four 400/533/667 MHz DDR2 memory modules (Max. 4GB)
PCI Bus Interface	33MHz, Revision 2.3

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SPECIFICATION	DESCRIPTION
ISA Bus Interface	Supports three fully compatible ISA slots without buffering **ISA DMA and ISA Bus Master function are not supported**
Serial ATA (SATA)	Four SATA II channels with 300Mb/s transfer rates (see **Table 1-1:**)
HDD Interface	One IDE channel supports two Ultra ATA 100/66/33 devices (see **Table 1-1:**)
Floppy Disk Drive (FDD)	Supports FDD
USB Interfaces	Six internal USB 2.0 connectors and one external USB port support seven USB devices
Serial Ports	Two RS-232 serial port connectors (COM1 and COM2)
Real Time Clock	256-byte battery backed CMOS RAM
Hardware Monitoring	Cooling fans, temperature and system voltages
Power Management	Supports Advanced Configuration and Power Interface (ACPI) Specifications Revision 2.0
Power Consumption	5V @ 6.75A, +12V @ 7.24A (Intel® Pentium® 4 3.0GHz, DDR2 533MHz 1GB*4) -3D MARK)
Infrared Support	One Infrared Data Association (IrDA) interface
Ethernet	Two PCI Express Gigabit Ethernet (PCI-E GbE) channels
BIOS	AMI BIOS

SPECIFICATION	DESCRIPTION
Physical Dimensions	12.2cm x 34.1cm (width x length)
Operating Temperature	Minimum: 0ºC (32°F) Maximum: 60°C (140°F)
Operating Humidity	Minimum: 5% Maximum: 95% \
Audio Interface	5.1 Channel audio kit with Realtek ALC655 AC `97 codec

Table 1-3: Technical Specifications

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Chapter

2

Detailed Specifications

2.1 Compatible Backplanes

The CPGx Series CPU card is compatible with the all CyberResearch PICMG1.0 backplanes. For information on these backplanes, visit the CyberResearch website: www.cyberresearch.com.

2.2 CPU Support

Table 2-1 lists the CPUs supported by the CPGx Series board.

Model	Clock Speed	L2 Cache	Max. FSB	Socket
Intel® Core™2 Duo	1.86 to 2.66 GHz	2 to 4 MB	1066 MHz	LGA775
Intel® Pentium® Processor Extreme Edition	3.2 GHz	2 x 1 to 2 MB	1066 MHz	LGA775
Intel® Pentium® D	2.80 to 3.60 GHz	2 x 1 to 2 MB	800 MHz	LGA775
Intel® Pentium® 4	2.66 to 3.80 GHz	1 to 2 MB	800 MHz	LGA775
Intel® Celeron® D	2.13 to 3.46 GHz	256 to 512 KB	533 MHz	LGA775

Table 2-1: Supported CPUs

2.2.1 Intel® Core™ Duo

The Intel® Core™ Duo processor comes with the following features:

- Two complete execution cores in one processor package provide advancements in simultaneous computing
- Dual-core processing efficiently delivers performance while balancing power requirements
- Two execution cores share a high-performance, power-optimized 667 MHz front-side bus (FSB) to access the same chipset memory.
- Enhanced Intel SpeedStep® technology allows a system to dynamically adjust processor voltage and core frequency, decreasing average power consumption and average heat production

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- Intel® Smart Cache Design allows two execution cores to share 2 MB of L2 cache, reducing FSB traffic and enhancing system responsiveness
- Intel® Advanced Thermal Manager supports new digital temperature sensors and thermal monitors on each execution core to enhance thermal monitoring accuracy
- Streaming SIMD Extensions 3 (SSE3) provides significant performance enhancement for multi-media applications
- Embedded lifecycle support protects system investment by enabling extended product availability for embedded and communications customers

2.2.2 Intel® Pentium® D

The Intel® Pentium® D processor comes with the following features:

- The two full processing cores make it easy to handle multiple applications, multimedia entertainment and digital photo editing simultaneously
- Intel® Extended Memory 64 Technology (Intel® EM64T) enables the processor to execute operating systems and applications written to take advantage of the Intel EM64T.
- Intel Speedstep® technology allows tradeoffs to be made between performance and power consumption.
- The Execute Disable Bit feature allows memory to be marked as executable or non-executable.

2.2.3 Intel® Pentium® 4

The Intel® Pentium® 4 processor comes with the following features:

- Hyper-Threading Technology improves system responsiveness and increases productivity and efficiency.
- Improved Power Management with Enhanced Intel SpeedStep® Technology
- Improved performance by allowing the system to address more than 4 GB of both virtual and physical memory.
- Execute Disable Bit prevent certain classes of malicious "buffer overflow" attacks when combined with a supporting operating system.

2.2.4 Intel® Celeron® D

The Intel® Celeron® D processor comes with the following features:

- Intel® Extended Memory 64 Technology provides 64-bit computing support and extends virtual and physical memory, giving the processor platform access to larger amounts of memory
- 512K L2 cache gives the processor core faster access to larger amounts of data used most often
- Intel® Streaming SIMD Extensions accelerates 3D graphics performance
- Execute Disable Bit Technology prevents certain classes of malicious "buffer overflow" attacks when combined with a supporting operating system.

2.3 On-board Chipsets

2.3.1 Northbridge and Southbridge Chipsets

The following chipsets are preinstalled on the board:

- **Northbridge**: Intel® 945G
- **Southbridge**: Intel® ICH7

The following two sections (**Section 2.3.2** and **Section 2.3.3**) lists some of the features of the Intel® 945G and the Intel® ICH7 chipsets. For more information on these two chipsets refer to the Intel website.

2.3.2 Intel® 945G Northbridge Chipset

The Intel® 945G Northbridge chipset comes with the following features:

- Supports Intel® Viiv™ Technology
- Dual-channel DDR2 Memory support
- Intel® Graphics Media Accelerator 950 delivers richer visual color and picture clarity without the need for additional discrete grahics cards.

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2.3.3 Intel® ICH7 Southbridge Chipset

The Intel® ICH7 Southbridge chipset comes with the following features:

- Integrated serial ATA host controller with data transfer rates up to 3.0 Gb/s
- Integrated IDE
  - Independent timing of up to two dirves
  - Ultra ATA/100/66/33, BMIDE and PIC modes
  - Tri-state modes to enable swap bay
- AC-Link for audio and telephony CODECs
- Intel Matrix Storage Technology
  - Protection against data loss from a hard drive failure
- High-speed SATA II storage interface with 3.0 Gb/s transfer rate
- Power management logic
  - Supports ACPI 3.0
  - PCI PME# support
- SMBus
  - Provides independent manageability bus through SMLink interface
  - Support SMBus 2.0 Specification

2.4 Graphics Support

2.4.1 Intel® GMA 950

The Intel® GMA 950 integrated on the Intel® 945G chipset has the following features.

- Intel® GMA 950 Graphics Core
  - 400MHz 256-bit graphics core
  - Up to 10.6 GB/sec memory bandwidth with DDR2 667 MHz system memory
  - 1.6 GPixels/sec and 1.6 GTexels/sec fill rate
  - 192 MB maximum video memory
  - 2048 x 1536 at 75 Hz maximum resolution
  - Operating systems supported: Microsoft® Windows® XP, Windows® XP 64-bit, Media Center Edition, Windows 2000; Linux-compatible (Xfree86 source available)
- High Performance 3D
  - Up to 4 pixels per clock rendering
  - Microsoft® DirectX® 9 Hardware Acceleration Features:
  - Pixel Shader 2, Volumetric Textures, Shadow Maps,
  - Slope Scale Depth Bias, Two-Sided Stencil
  - Microsoft® DirectX® 9 Vertex Shader 3.0 and Transform and Lighting supported in SW through highly optimized
  - Processor Specific Geometry Pipeline (PSGP)
  - Texture Decompression for DirectX® and OpenGL®
  - OpenGL® 1.4 support with ARB extensions
- Advanced Display Technology
  - Interlaced Display output support

2.4.2 Analog VGA

The on-board analog VGA has the following features.

- Supports 400MHz, 24-bit RAMDAC (RAM digital to analog converter)
- Supports displays with resolutions up to 2048x1536 pixels

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2.4.3 Digital Visual Interface (DVI)

The DVI interface on the CPGU Series boards is controlled by the Silicon Image SiI362 chip and has the following features.

- Incorporates the latest PanelLink® technology with support display resolutions ranging from VGA to UXGA (1600x1200) in a single link interface.
- Supports Intel® Serial Digital Video Output (SDVO) technology
- I2C slave interface for access to internal registers
- Dual I2C pass-through interfaces for host I2C access of EDID (via DDC) and configuration EEPROM (on ADD2 Card)
- Low-voltage input signaling interface: 175mV to 1.2V
- Monitor detection supported through Hot Plug or Receiver Sense
- Cable distance support greater than 10 meters
- DVI 1.0 compliant, with significantly greater margin than competitive solutions
- 48-pin LQFP package without EEPROM interface (motherboard applications)

2.5 Data Flow

Figure 2-1 shows the data flow between the user-installed CPU, the two on-board chipsets, and other components installed on the CPU card.

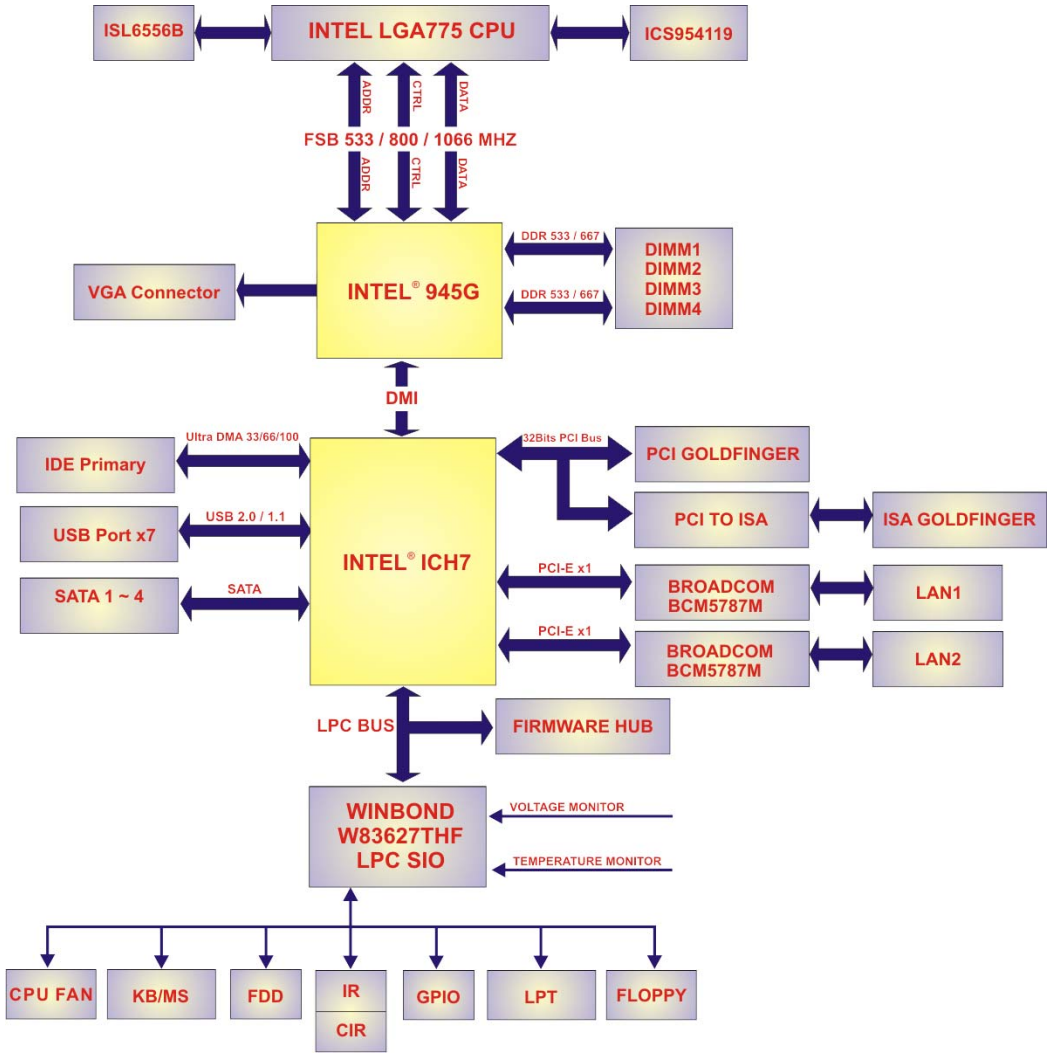

Figure 2-1: Data Flow Block Diagram

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2.6 Memory Support

The CPGx Series CPU card has two 240-pin dual inline memory module (DIMM) sockets that support up to two unbuffered DDR2 DIMMs with the following specifications:

- **Maximum RAM**: 2GB (1GB module in each slot)
- **DIMM Transfer Rates**: 667MHz, 533MHz, 400MHz
- Up to 10.6 GB/sec memory bandwidth

2.7 PCI Bus Interface Support

The PCI bus on the CPGx SeriesCPU card has the following features:

NOTE:

The CPGx Series does not support ISA DMA and ISA Bus Master function. Before purchasing your ISA device, please confirm with your vendor that your ISA card is supported by the CPU board.

- 33MHz Revision 2.3 is implemented
- Up to four external bus masters are supported
- 2.X ISA bus interface supported
- Three fully compatible ISA slots without buffering supported

2.8 GbE Ethernet Connection

The two GbE controllers (Broadcom BCM5787) on the CPGx Series CPU card connect to two 10/100/1000Mb/s Ethernet RJ-45 LAN ports on the rear panel. The BCM5787 is a seventh generation 10/100/1000BASE-T Ethernet LAN controller solution for high performance network applications. The device combines a triple-speed IEEE 802.3 compliant Media Access Controller (MAC) with a triple-speed Ethernet transceiver, PCIe bus interface, and on-chip buffer memory in a single device. The device is fabricated in a

1.2V CMOS process providing a low-power system solution. The GbE controllers come with the following features:

- Integrated 10/100/1000 transceiver
- 10/100/1000 full/half-duplex MAC
- Automatic MDI crossover function
- Supports PCIe v1.0a
- Wake-on-LAN support meeting the ACPI requirements
- Statistics for SNMP MIB II, Ethernet-like MIB and Ethernet MIB (802.3z, clause 30)
- Serial EEPROM or serial flash supported
- JTAG supported
- 196-FBGA package

2.9 Drive Interfaces

The CPGT Series models supports the following drive interfaces:

- 4 x SATA II drives
- 1 x IDE channel supports two Ultra ATA 100/66/33 devices
- 1 x FDD

The CPGU Series models supports the following drive interfaces:

- 4 x SATA II drives
- 1 x IDE channel supports two Ultra ATA 100/66/33 devices
- 1 x FDD

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2.9.1 SATA Drives

The CPGx Series supports the SATA II drive interfaces with transfer rates up to 300Mb/s with the ICH7 Southbridge chipset.

2.9.2 IDE HDD Interfaces

The IDE controller on the ICH7 Southbridge chipset integrated on the CPU card supports two HDDs with the following specifications:

- Supports PIO IDE transfers up to 16MB/s
- Supports the following Ultra ATA devices:
  - **Ultra ATA/33**, with data transfer rates up to 33MB/s
  - **Ultra ATA/66**, with data transfer rates up to 66MB/s
  - **Ultra ATA/100**, with data transfer rates up to 100MB/s

2.9.3 Floppy Disk Drive (FDD)

The CPGx Series CPU card supports a single FDD. The following FDD formats are compatible with the board.

- 5.25": 360KB and 1.2MB
- 3.5": 720KB, 1.44MB and 2.88MB

2.10 Serial Ports

The CPGx Series CPU card has two high-speed UART serial ports, configured as COM1 and COM2. The serial ports have the following specifications.

- 16C550 UART with 16-byte FIFO buffer
- 115.2Kbps transmission rate

2.11 Real Time Clock

256-byte battery backed CMOS RAM

2.12 System Monitoring

The CPGx Series CPU card is capable of self-monitoring various aspects of its operating status including:

- CPU, chipset, and battery voltage, +3.3V, +5V, and +12V
- RPM of cooling fans
- CPU and board temperatures (by the corresponding embedded sensors)

2.13 Infrared Data Association (IrDA) Interface

The CPGx Series CPU card IrDA supports the following interfaces.

- Serial Infrared (SIR)
- Amplitude Shift Keyed Infrared (ASKIR)

If you want to use the IrDA port, you have to configure SIR or ASKIR mode in the BIOS under **Super IO devices**. The normal RS-232 COM2 will be disabled.

2.14 USB Interfaces

The CPGx Series CPU card has seven USB interfaces, six internal and one external. The USB interfaces support USB 2.0.

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2.15 BIOS

The CPGx Series CPU card uses a licensed copy of AMI BIOS. The features of the flash BIOS used are listed below:

- SMIBIOS (DMI) compliant
- Console redirection function support
- PXE (**P**re-Boot E**x**ecution **E**nvironment) support
- USB booting support

2.16 Operating Temperature and Temperature Control

The maximum and minimum operating temperatures for the CPGx Series CPU card are listed below.

- Minimum Operating Temperature: 0ºC (32°F)
- Maximum Operating Temperature: 60°C (140°F)

A cooling fan and heat sink must be installed on the CPU. Thermal paste must be smeared on the lower side of the heat sink before it is mounted on the CPU. Heat sinks are also mounted on the Northbridge and Southbridge chipsets to ensure the operating temperature of these chips remain low.

2.17 Optional Audio Interface

The CPGx Series CPU card does not have a built-in AC'97 audio codec. If your system needs audio then this connector must be connected to an external audio module with Realtek ALC655.

2.18 Power Consumption

Table 2-2 shows the power consumption parameters for the CPGx Series CPU card when a 3GHz Intel® Pentium® 4 processor is running with four 1GB, DDR2 533MHz SDRAM memory modules.

Voltage	Current
5V	6.75A
+12V	7.24A

Table 2-2: Power Consumption

2.19 Packaged Contents and Optional Accessory Items

2.19.1 Package Contents

When you unpack the CPGx Series CPU card you should find the following components.

- 1 x CPGx Series single board computer
- 1 x Mini jumper pack
- 1 x ATA 66/100 flat cable
- 1 x Dual RS-232 cable
- 2 x SATA cables
- 1 x SATA power cable
- 1 x Keyboard/ PS2 mouse Y cable
- 1 x USB cable
- 1 x Utility CD
- Audio Kit

2.19.2 Special Items

The following additional items are shipped with the CPGU Series CPU card models.

- 2 x SATA cables
- 1 x SATA power cable

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2.19.3 Optional Accessory Items

The items shown in the list below are separately purchased optional accessory items depending upon which model card is purchased.

- DVI cable
- CPU cooler
- FDD cable
- LPT cable

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Chapter

3

Connectors and Jumpers

3.1 Peripheral Interface Connectors

The location of the peripheral interface connectors are shown in **Section 3.1.1**. A complete list of all the peripheral interface connectors can be seen in **Section 3.2**.

3.1.1 CPGx Series CPU Card Layout

Figure 3-1 shows the on-board peripheral connectors, backplane peripheral connectors and on-board jumpers (CPGT does not have DVI connector).

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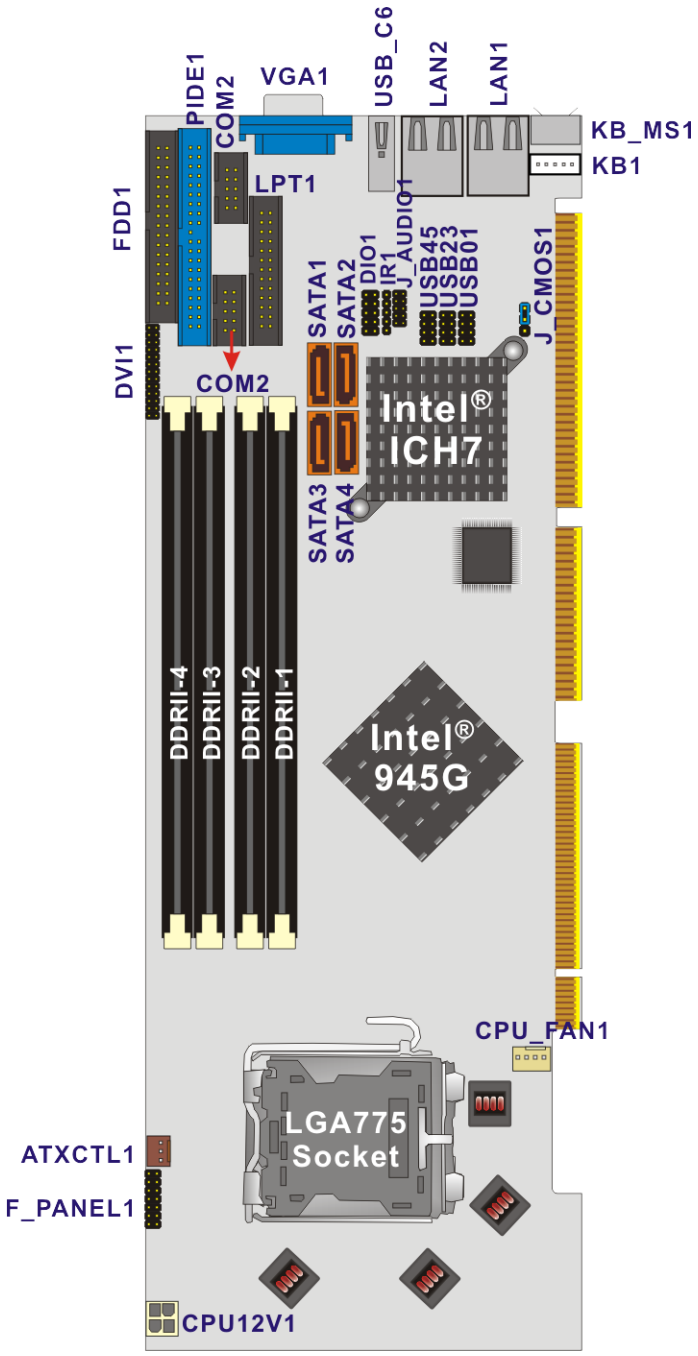

Figure 3-1: Connector and Jumper Locations

3.1.2 Peripheral Interface Connectors

Table 3-1 lists the peripheral interface connectors on the CPGx Series CPU card. Detailed descriptions of these connectors can be found in **Section 3.2**.

Label	Connector	Type
CPU12V1	ATX-12V CPU Power Source	4-pin terminal block
J_AUDIO1	Audio Module Connector	9-pin header
ATXCTL1	Backplane to Mainboard Power Connector	3-pin wafer connector
CPU_FAN1	CPU Fan Connector	4-pin wafer connector
DIO1	Digital I/O Connector	10-pin header
DVI1	Digital Visual Interface Connector	25-pin header
FDD1	FDD Connector	34-pin box header
F_PANEL1	Front Panel Connector	14-pin header
PIDE1	IDE Connector	40-pin box header
IR1	IrDA Infrared Interface Connector	5-pin header
KB1	Keyboard Connector	4-pin wafer connector
LPT1	Parallel Port Connector	25-pin box header
COM1 COM2	RS-232 Serial Port Connectors	10-pin box header

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SATA1 SATA2 SATA3 SATA4	Serial ATA Connectors	7-pin SATA connector
USB01 USB23 USB45	USB Connectors	8-pin header

Table 3-1: Peripheral Interface Connectors

3.1.3 External Peripheral Interface Connectors

Table 3-2 lists the external peripheral interface connectors on the CPGx Series. Detailed descriptions of these connectors can be found in **Section 3.3**.

Connector	Type	Label
Ethernet connectors	RJ-45 connector	LAN1 LAN2
Keyboard/mouse connector	MINI-DIN connector	KB_MS1
USB connector	USB 2.0 connector	USB_C6
VGA connector	HD-D-sub 15 female connector	VGA1

Table 3-2: External Peripheral Interface Connectors

3.1.4 On-board Jumper

Table 3-3 lists the on-board jumper. Detailed descriptions of this jumper can be found in **Section 4.6**.

Label	Connector	Type
J_CMOS1	CMOS state setting	3-pin header

Table 3-3: On-board Jumper

3.2 Internal Peripheral Connectors

Internal peripheral connectors are found on the CPU card and are only accessible when the CPU card is outside of the chassis. This section has complete descriptions of all the internal peripheral connectors on the CPGx Series CPU card.

3.2.1 ATX-12V Power Source Connector

CN Label: **CPU12V1**

CN Type: 4-pin terminal block

CN Location: See **Figure 3-2**

CN Pinouts: See **Table 3-4**

This connector supports the ATX-12V power supply.

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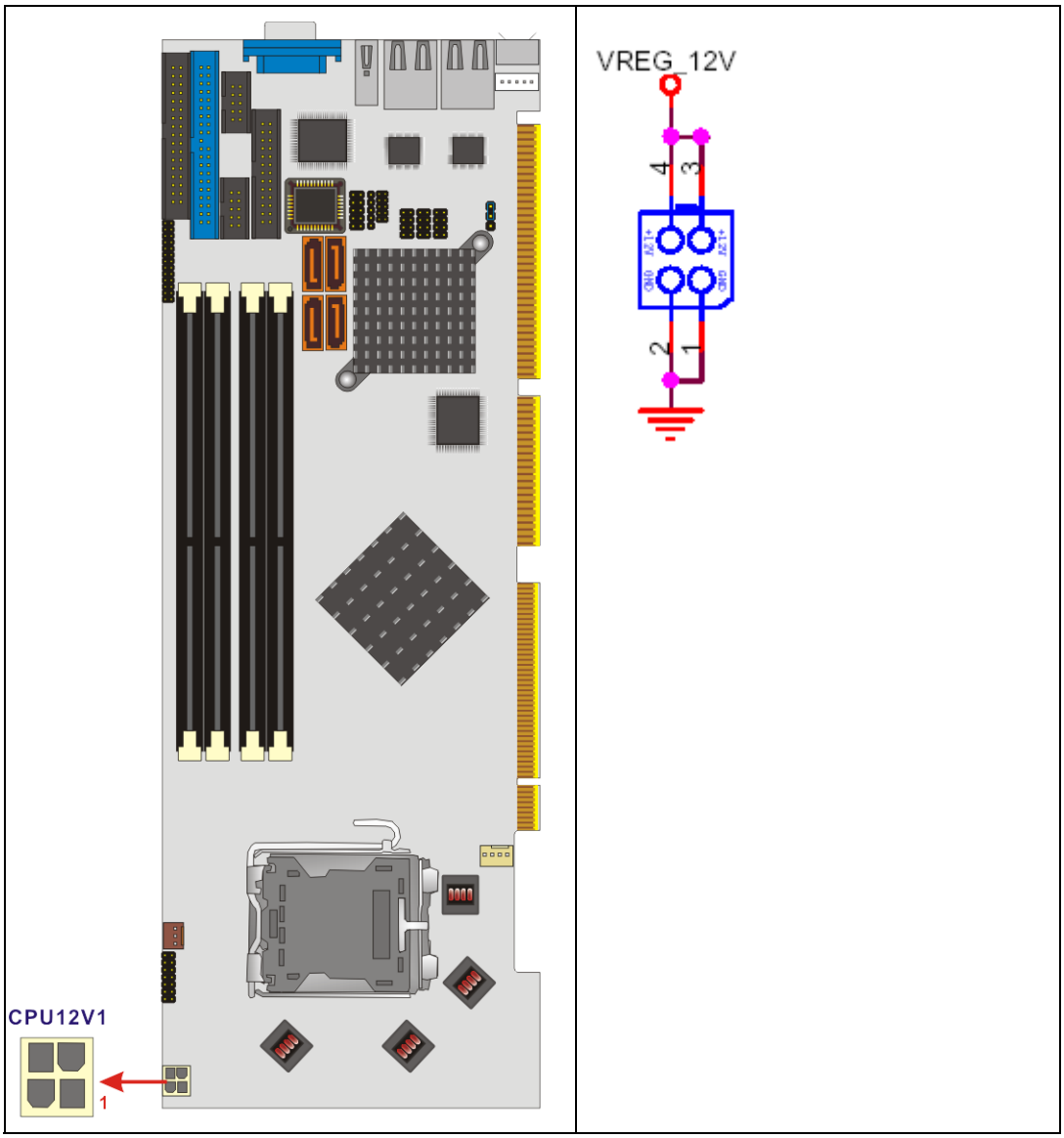

Figure 3-2: ATX–12V Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	GND	2	GND
3	+12V	4	+12V

Table 3-4: ATX–12V Connector Pinouts

3.2.2 Audio Module Connector

CN Label: **J_AUDIO1**

CN Type: 10- pin header

CN Location: See **Figure 3-3**

CN Pinouts: See **Table 3-5**

The CPGx Series CPU card does not have a built-in AC'97 audio codec. If your system needs audio then this connector must be connected to an external audio module.

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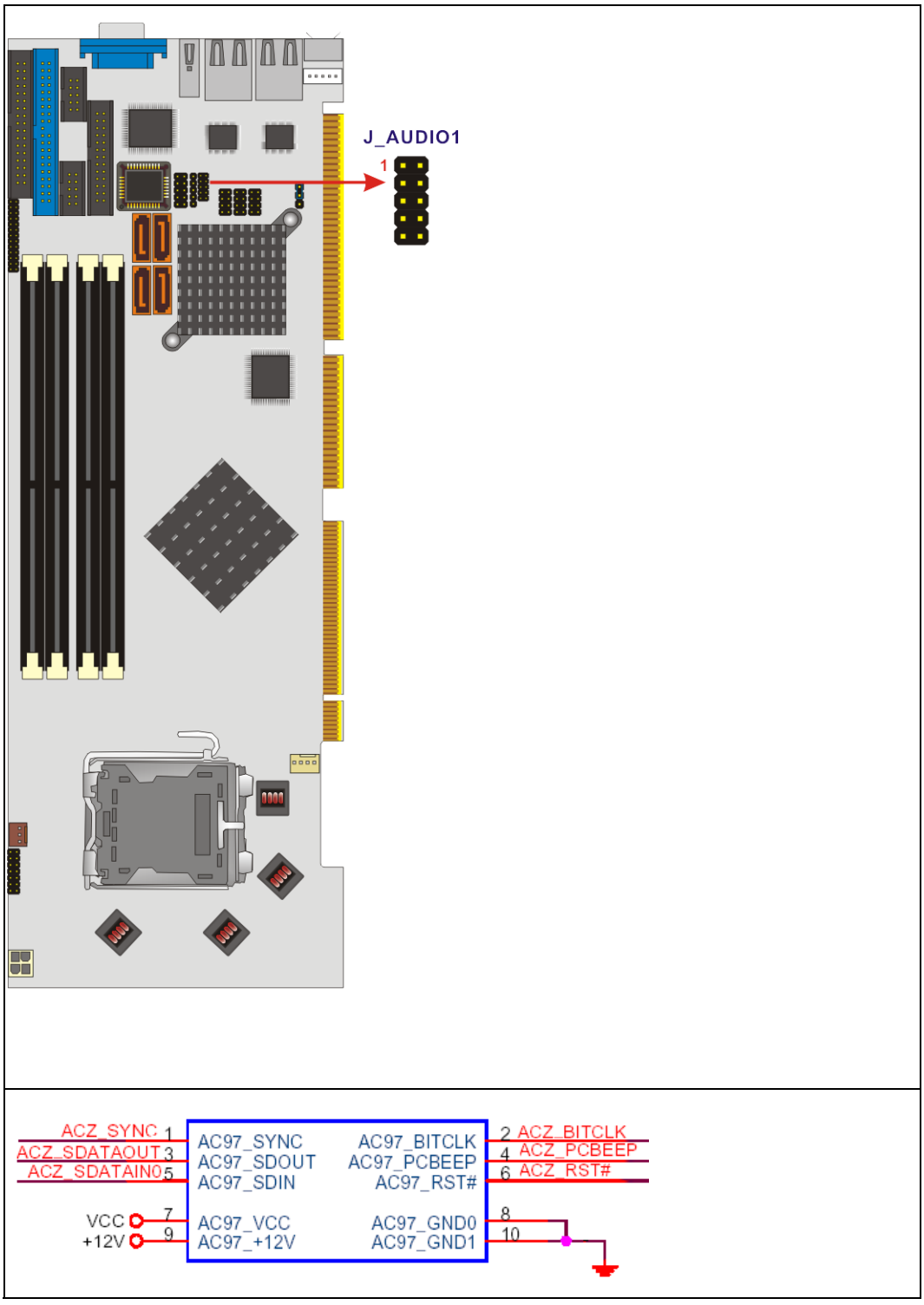

Figure 3-3: Audio Module Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	SYNC	2	BITCLK
3	SDOUT	4	PCBEEP
5	SDIN	6	RST#
7	VCC	8	GND
9	+12V		

Table 3-5: Audio Module Connector Pinouts

3.2.3 Backplane to Mainboard Power Connector

CN Label: **ATXCTL1**

CN Type: 3-pin wafer connector

CN Location: See **Figure 3-4**

CN Pinouts: See **Table 3-6**

Connects a power source from a backplane with an ATX Connector.

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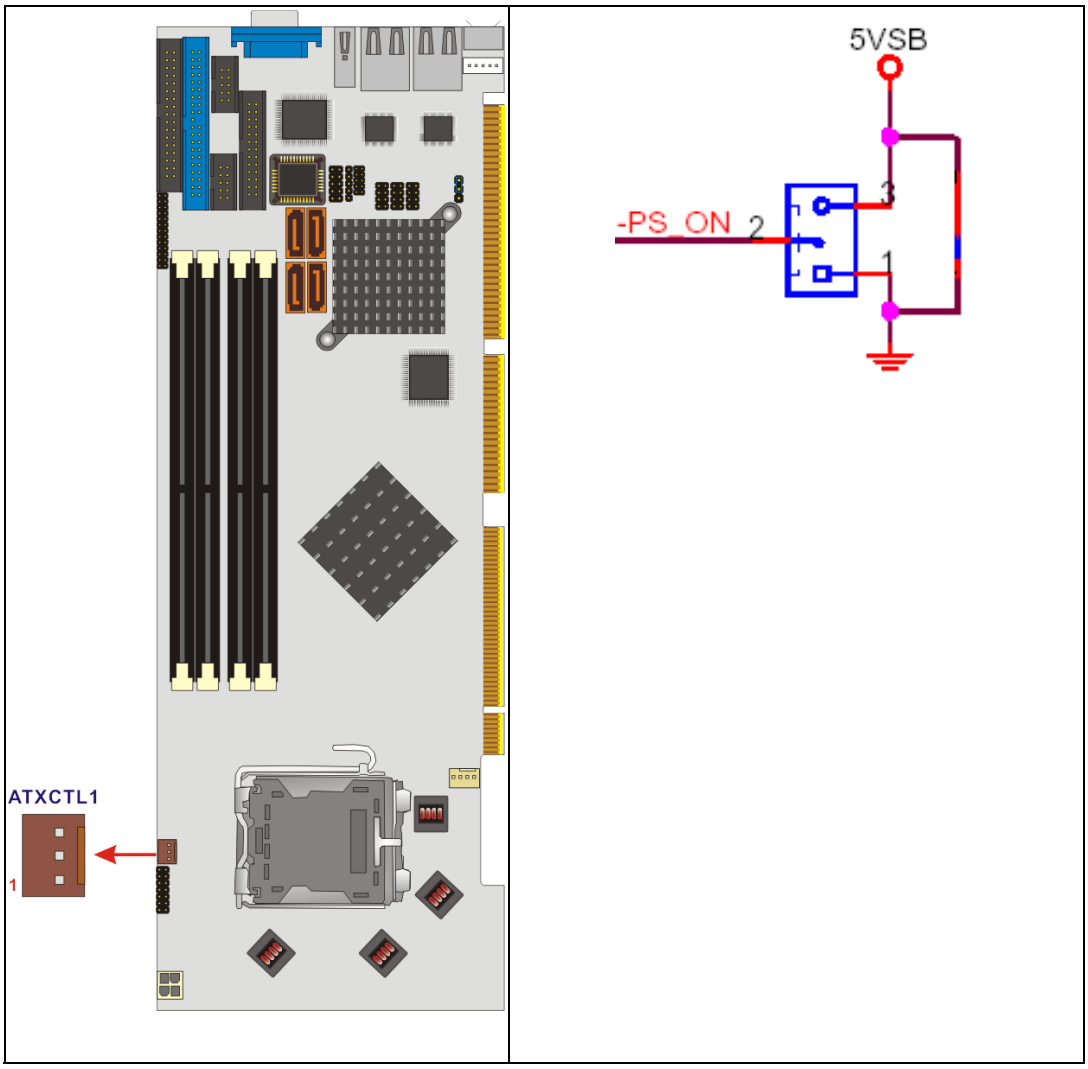

Figure 3-4: Backplane to Mainboard Power Connector Location

PIN NO.	DESCRIPTION
1	GND
2	ATX-ON
3	5VSB

Table 3-6: Backplane to Mainboard Power Pinouts

3.2.4 CPU Fan Connector

CN Label: **CPU_FAN1**

CN Type: 4-pin wafer connector

CN Location: See **Figure 3-5**

CN Pinouts: See **Table 3-7**

The cooling fan connector provides a 12V, 500mA current to a CPU cooling fan. The connector has a "rotation" pin to get rotation signals from fans and notify the system so the system BIOS can recognize the fan speed. Please note that only specified fans can issue the rotation signals.

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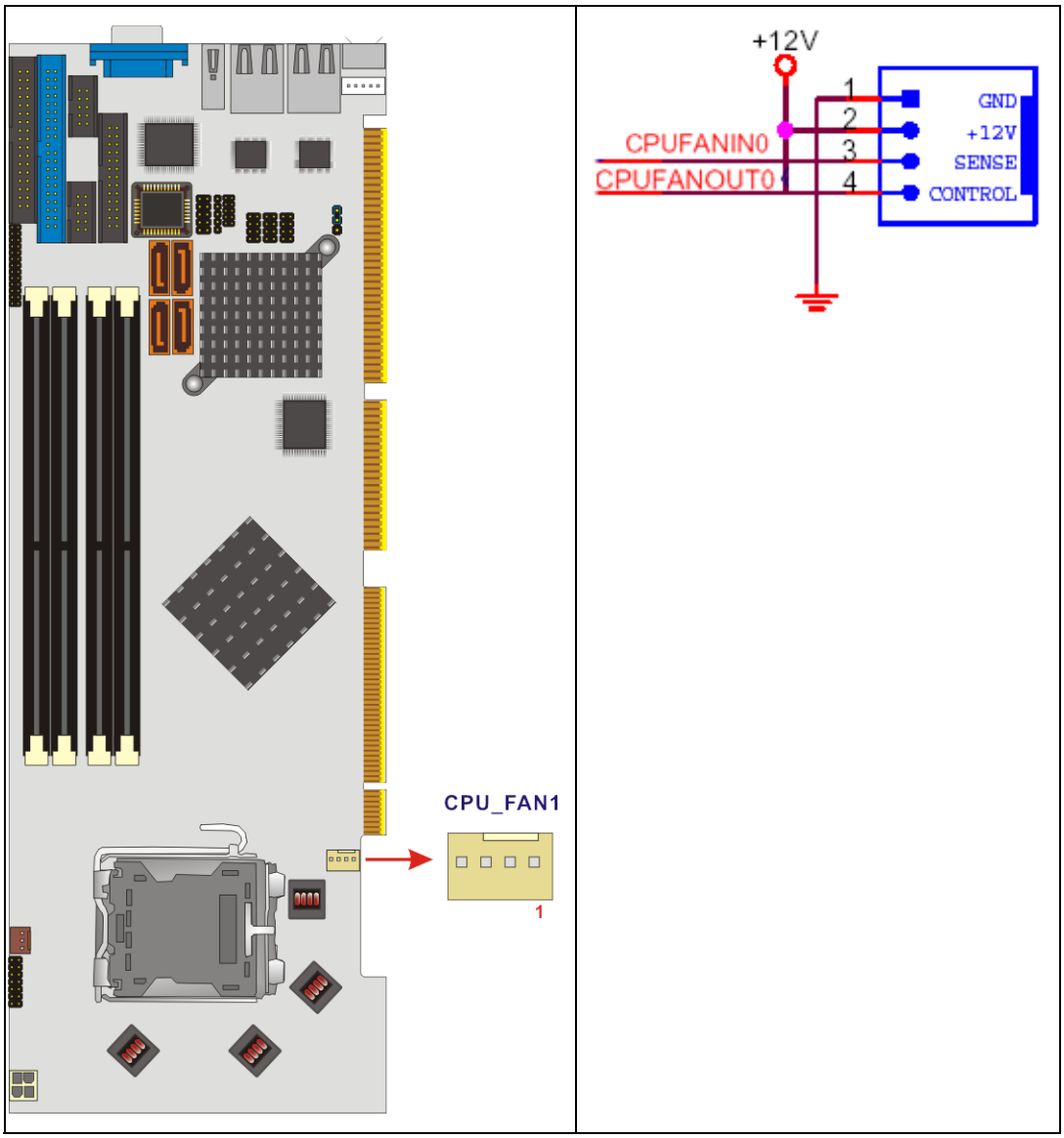

Figure 3-5: CPU Fan Connector Location

PIN	DESCRIPTION
1	Ground
2	+12V
3	Rotation Signal
4	Control

Table 3-7: CPU Fan Connector Pinouts

3.2.5 Digital Input/Output (DIO) Connector

CN Label: **DIO1**

CN Type: 10-pin header

CN Location: See **Figure 3-6**

CN Pinouts: See **Table 3-8**

The DIO connector is managed through a Super I/O chip. The DIO connector pins are user programmable. Refer to **Appendix B** for details.

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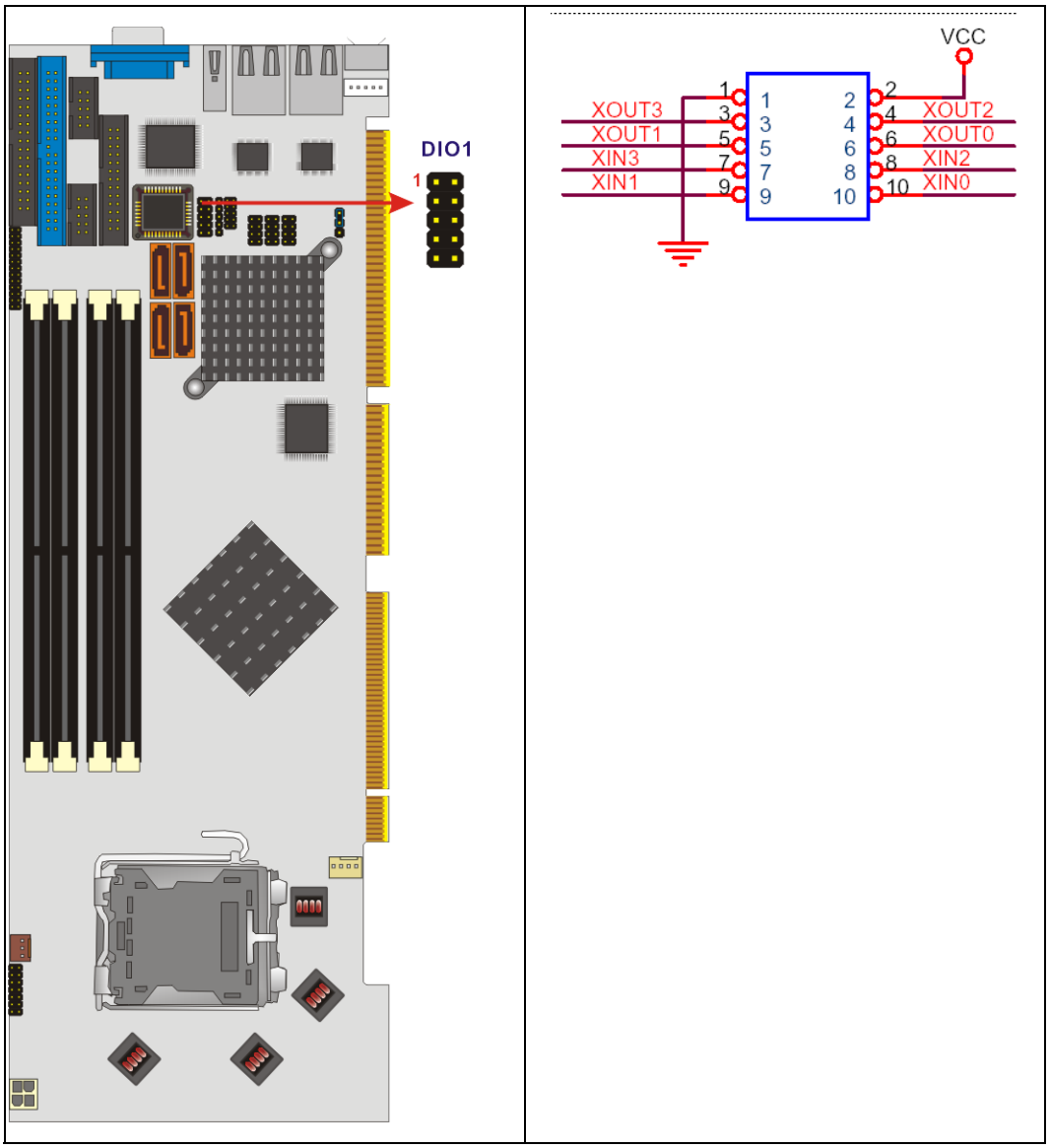

Figure 3-6: DIO Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Ground	2	VCC
3	Output 0	4	Output 1
5	Output 2	6	Output 3
7	Input 0	8	Input 1
9	Input 2	10	Input 3

Table 3-8: DIO Connector Pinouts

3.2.6 DVI (Digital Visual Interface) Connector

CN Label: **DVI1**

CN Type: 25-pin header

CN Location: See **Figure 3-7**

CN Pinouts: See **Table 3-9**

The CPGU models provides a digital visual interface for digital display. Optional accessory modules can be selected to connect to external DVI devices.

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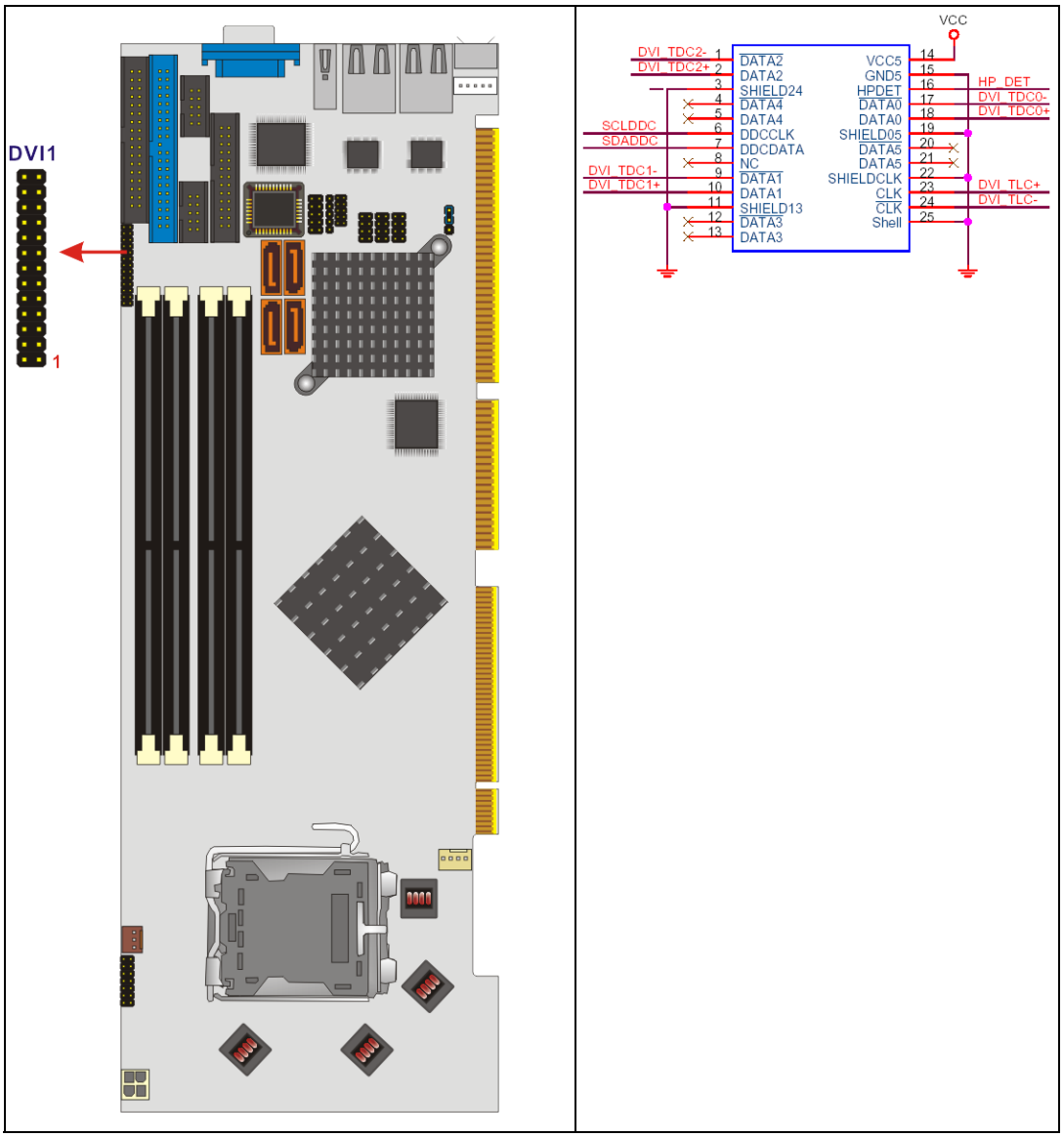

Figure 3-7: DVI Connector Location

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	Data 2-	14	VCC
2	Data 2+	15	GND
3	GND	16	Hot Plug Detect.
4	N/C	17	Data 0-
5	N/C	18	Data 0+
6	DDC Clock	19	GND

7	**DDC Data**	**20**	**N/C**
8	**N/C**	**21**	**N/C**
9	**Data 1-**	**22**	**GND**
10	**Data 1+**	**23**	**Clock +**
11	**GND**	**24**	**Clock -**
12	**N/C**	**25**	**GND**
13	**N/C**		

Table 3-9: DVI Connector Pinouts

3.2.7 FDD Connector

CN Label: **FDD1**

CN Type: 34-pin header

CN Location: See **Figure 3-8**

CN Pinouts: See **Table 3-10**

The CPGx Series is shipped with a 34-pin daisy-chain drive connector cable. This cable can be connected to the FDD connector.

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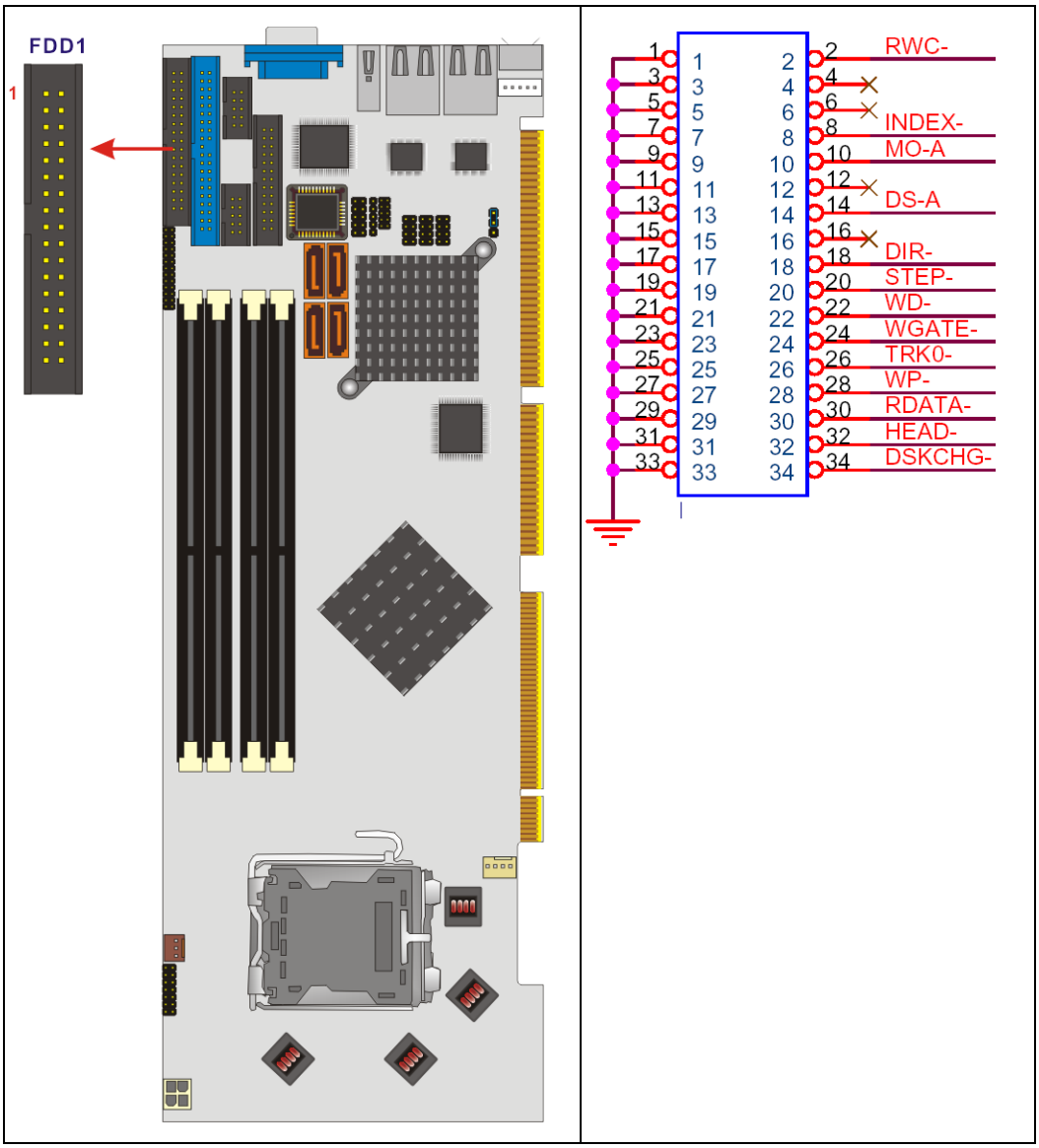

Figure 3-8: FDD Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	2	REDUCE WRITE
3	GND	4	N/C
5	N/C	6	N/C
7	GND	8	INDEX#
9	GND	10	MOTOR ENABLE A#

11	**GND**	**12**	**DRIVE SELECT B#**
13	**GND**	**14**	**DRIVE SELECT A#**
15	**GND**	**16**	**MOTOR ENABLE B#**
17	**GND**	**18**	**DIRECTION#**
19	**GND**	**20**	**STEP#**
21	**GND**	**22**	**WRITE DATA#**
23	**GND**	**24**	**WRITE GATE#**
25	**GND**	**26**	**TRACK 0#**
27	**GND**	**28**	**WRITE PROTECT#**
29	**GND**	**30**	**READ DATA#**
31	**GND**	**32**	**SIDE 1 SELECT#**
33	**GND**	**34**	**DISK CHANGE#**

Table 3-10: FDD Connector Pinouts

3.2.8 Front Panel Connector

CN Label: **F_PANEL1**

CN Type: 14-pin header

CN Location: See **Figure 3-9**

CN Pinouts: See **Table 3-11**

The system front panel connector connects to:

- the system chassis front panel LEDs
- the chassis speaker
- the power switch
- the reset button

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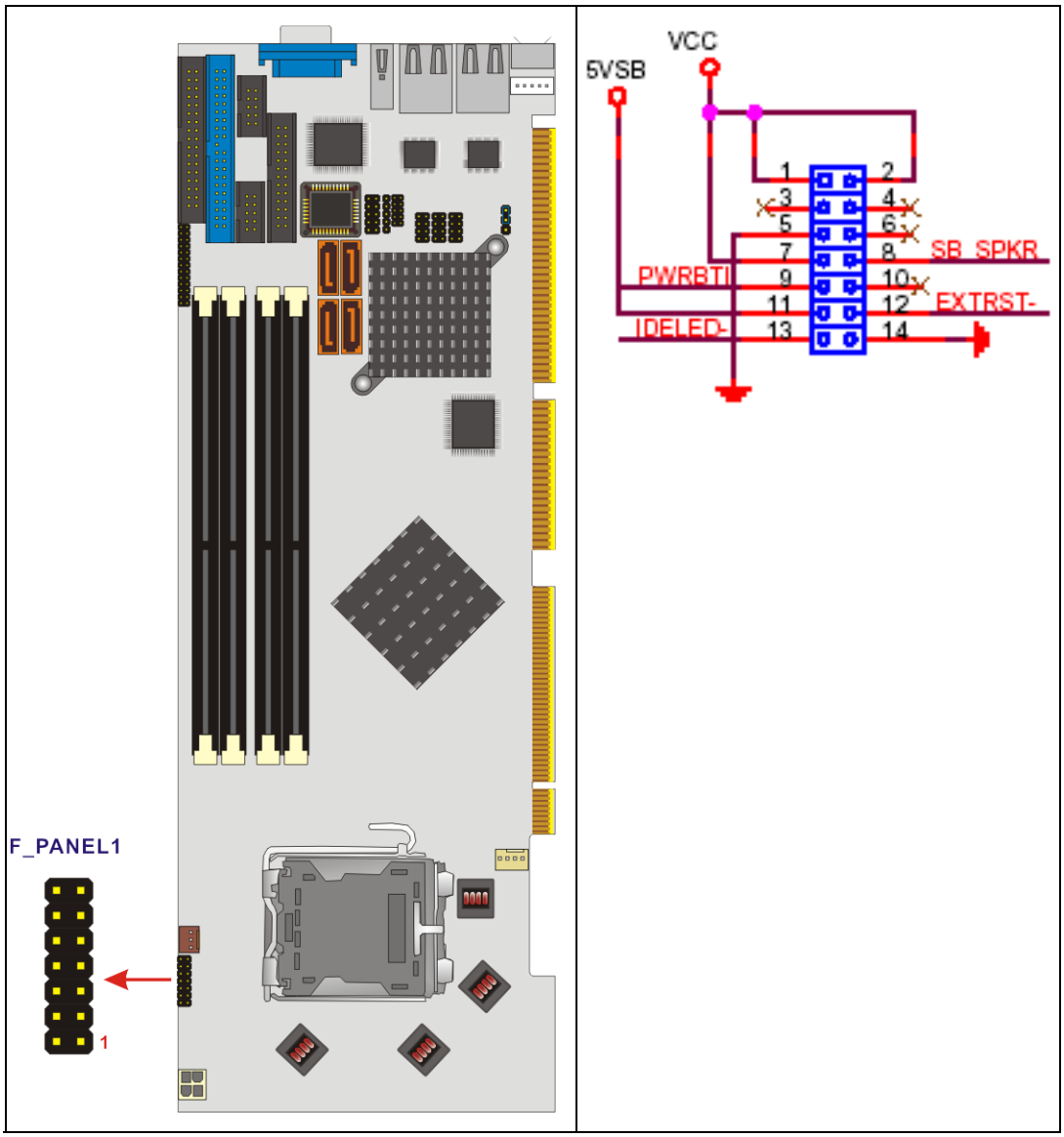

Figure 3-9: Front Panel Connector Location

FUNCTION	PIN	DESCRIPTION	FUNCTION	PIN	DESCRIPTION
Power LED	1	PWR_LED+	Speaker	2	SPKR+
	3	N/C		4	N/C
	5	PWR_LED-		6	N/C
PWRBTN	7	PWR_BTN+		8	SPKR-
	9	PWR_BTN-	RESET	10	N/C
HDDLED	11	HDD_LED+		12	RESET+
	13	HDD_LED-		14	RESET-

Table 3-11: Front Panel Connector Location

3.2.9 IDE Connector

CN Label: **PIDE1**

CN Type: 40-pin box header

CN Location: See **Figure 3-10**

CN Pinouts: See **Table 3-12**

One IDE connector provides connectivity for two IDE devices.

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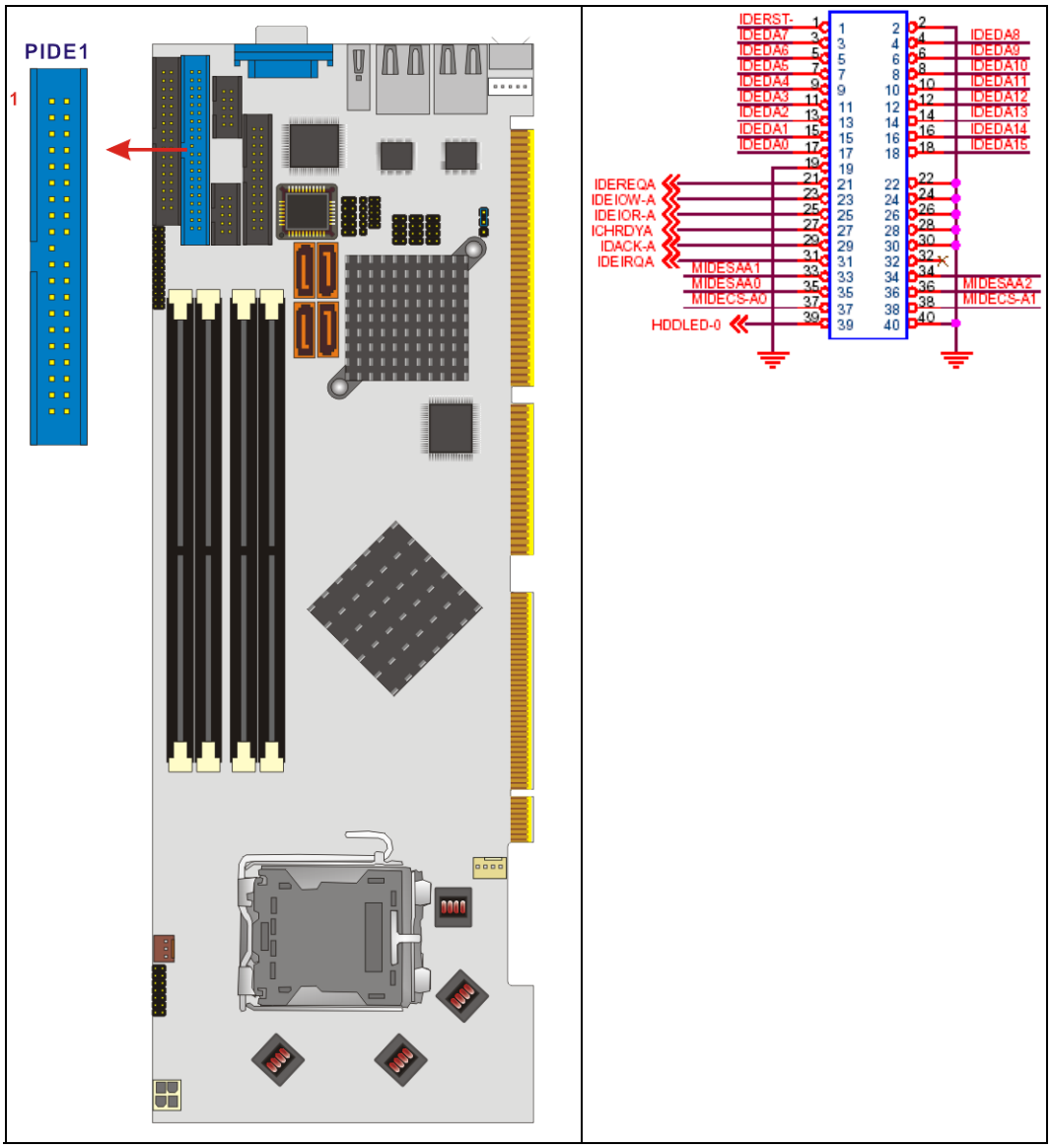

Figure 3-10: IDE Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	RESET#	2	GND
3	DATA 7	4	DATA 8
5	DATA 6	6	DATA 9
7	DATA 5	8	DATA 10
9	DATA 4	10	DATA 11
11	DATA 3	12	DATA 12
13	DATA 2	14	DATA 13
15	DATA 1	16	DATA 14
17	DATA 0	18	DATA 15
19	GND	20	N/C
21	IDE DRQ	22	GND
23	IOW#	24	GND
25	IOR#	26	GND
27	IDE CHRDY	28	BALE – DEFAULT
29	IDE DACK	30	GND
31	INTERRUPT	32	N/C
33	SA1	34	PDIAG#
35	SA0	36	SA2
37	HDC CS0#	38	HDC CS1#
39	HDD ACTIVE#	40	GND

Table 3-12: IDE Connector Pinouts

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3.2.10 IrDA Interface Connector

CN Label: **IR1**

CN Type: 5-pin header

CN Location: See **Figure 3-11**

CN Pinouts: See **Table 3-13**

The integrated IrDA interface connector supports both the SIR and ASKIR infrared protocols.

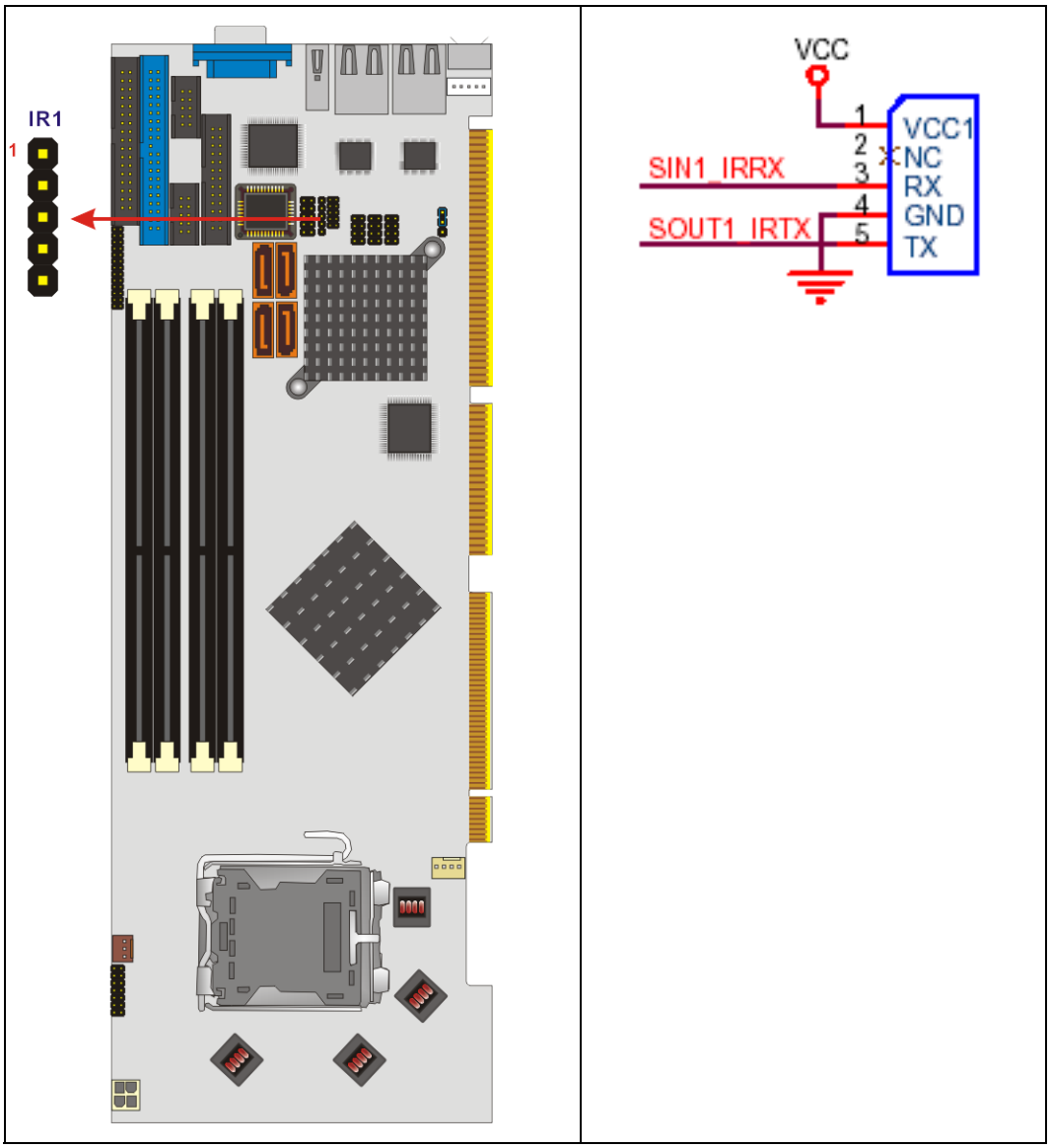

Figure 3-11: IrDA Interface Connector Location

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PIN	DESCRIPTION
1	VCC
2	NC
3	SIN1_IRRX
4	GND
5	SOUT1_IRTX

Table 3-13: IrDA Interface Connector Pinouts

3.2.11 Keyboard Connector

CN Label: **KB1**

CN Type: 4-pin wafer

CN Location: See **Figure 3-12**

CN Pinouts: See **Table 3-14**

For alternative application, a keyboard pin header connector is also available on board. This connector requires a special adapter cable.

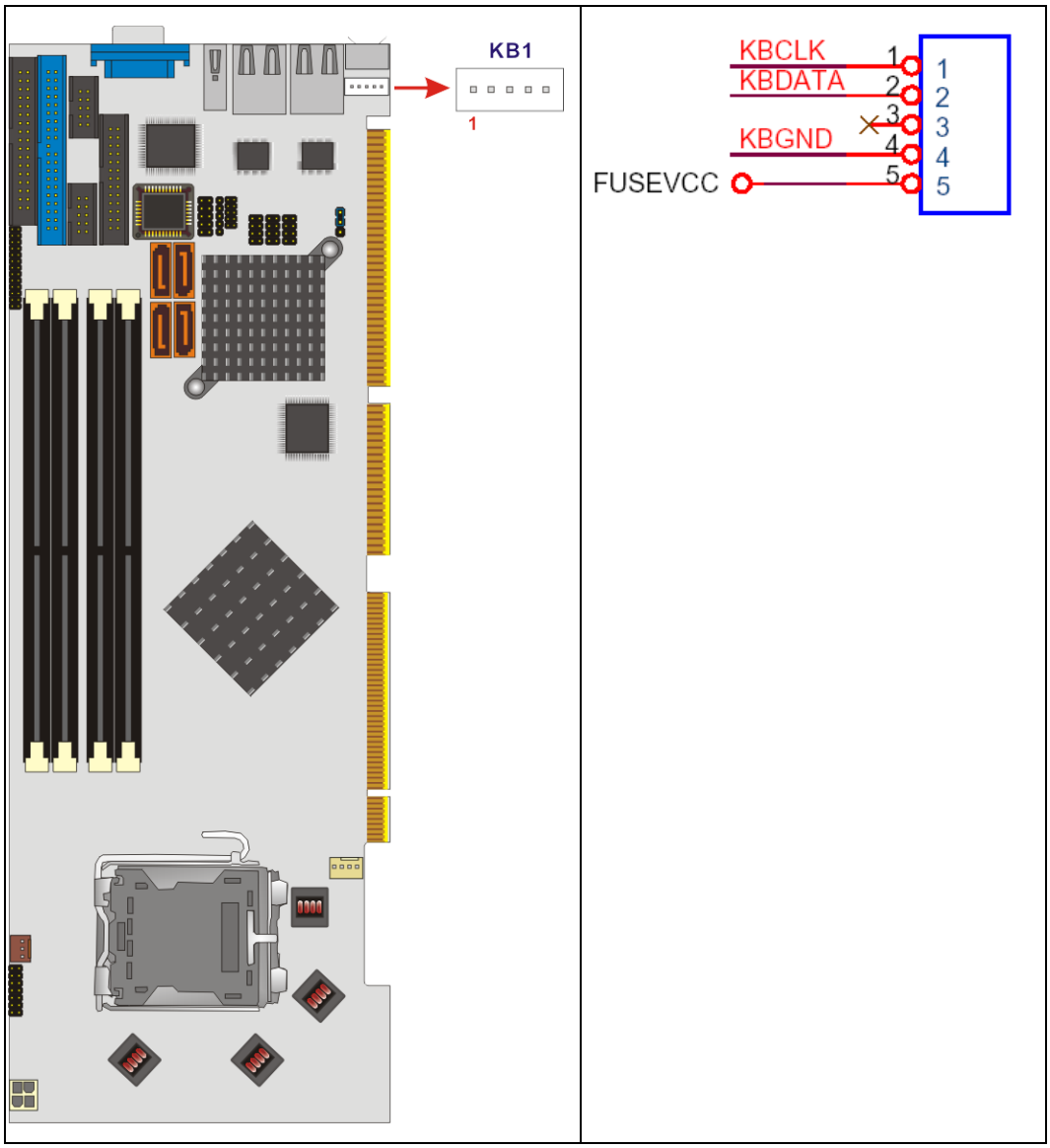

Figure 3-12: Keyboard Connector Location

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PIN	DESCRIPTION
1	Keyboard Clock
2	Keyboard Data
3	NC
4	GND
5	VCC

Table 3-14: KB1 Connector Pinouts

3.2.12 Parallel Port Connector

CN Label: **LPT1**

CN Type: 25-pin box header

CN Location: See **Figure 3-13**

CN Pinouts: See **Table 3-15**

The parallel port connector is usually connected to a printer or other parallel device with a 26-pin flat-cable connector.

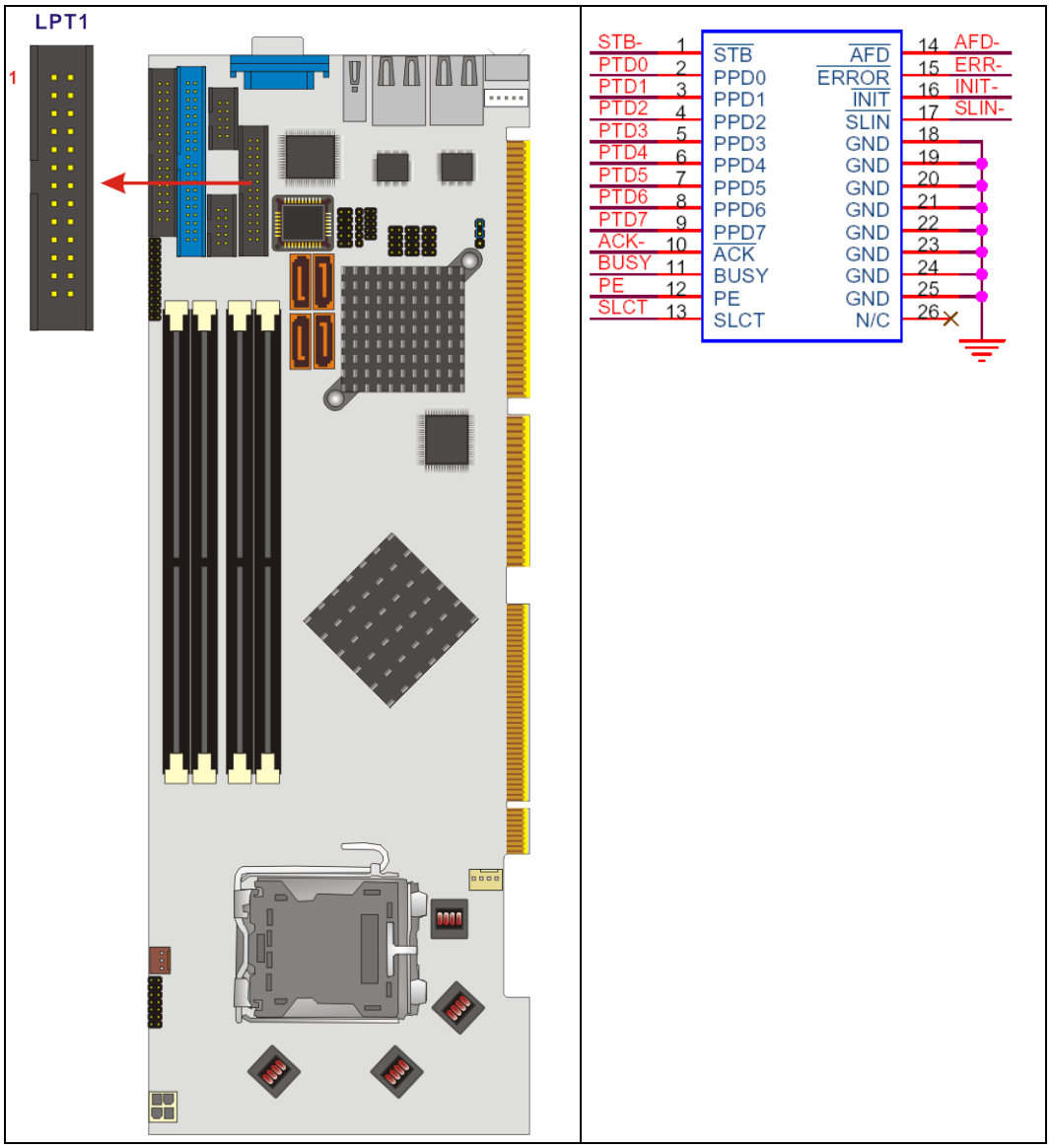

Figure 3-13: Parallel Port Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	STROBE#	14	AUTO FORM FEED #
2	DATA0	15	ERROR#
3	DATA1	16	INITIALIZE#
4	DATA2	17	PRINTER SELECT LN#
5	DATA3	18	GND
6	DATA4	19	GND

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7	**DATA5**	**20**	**GND**
8	**DATA6**	**21**	**GND**
9	**DATA7**	**22**	**GND**
10	**ACKNOWLEDGE#**	**23**	**GND**
11	**BUSY**	**24**	**GND**
12	**PAPER EMPTY**	**25**	**GND**
13	**PRINTER SELECT**		

Table 3-15: Parallel Port Connector Pinouts

3.2.13 RS-232 Serial Port Connectors

CN Label: **COM1, COM2**

CN Type: 10-pin box header

CN Location: See **Figure 3-14**

CN Pinouts: See **Table 3-16**

The CPGx Series CPU card has two internal high-speed UART connectors accessed through a 10-pin cable connector.

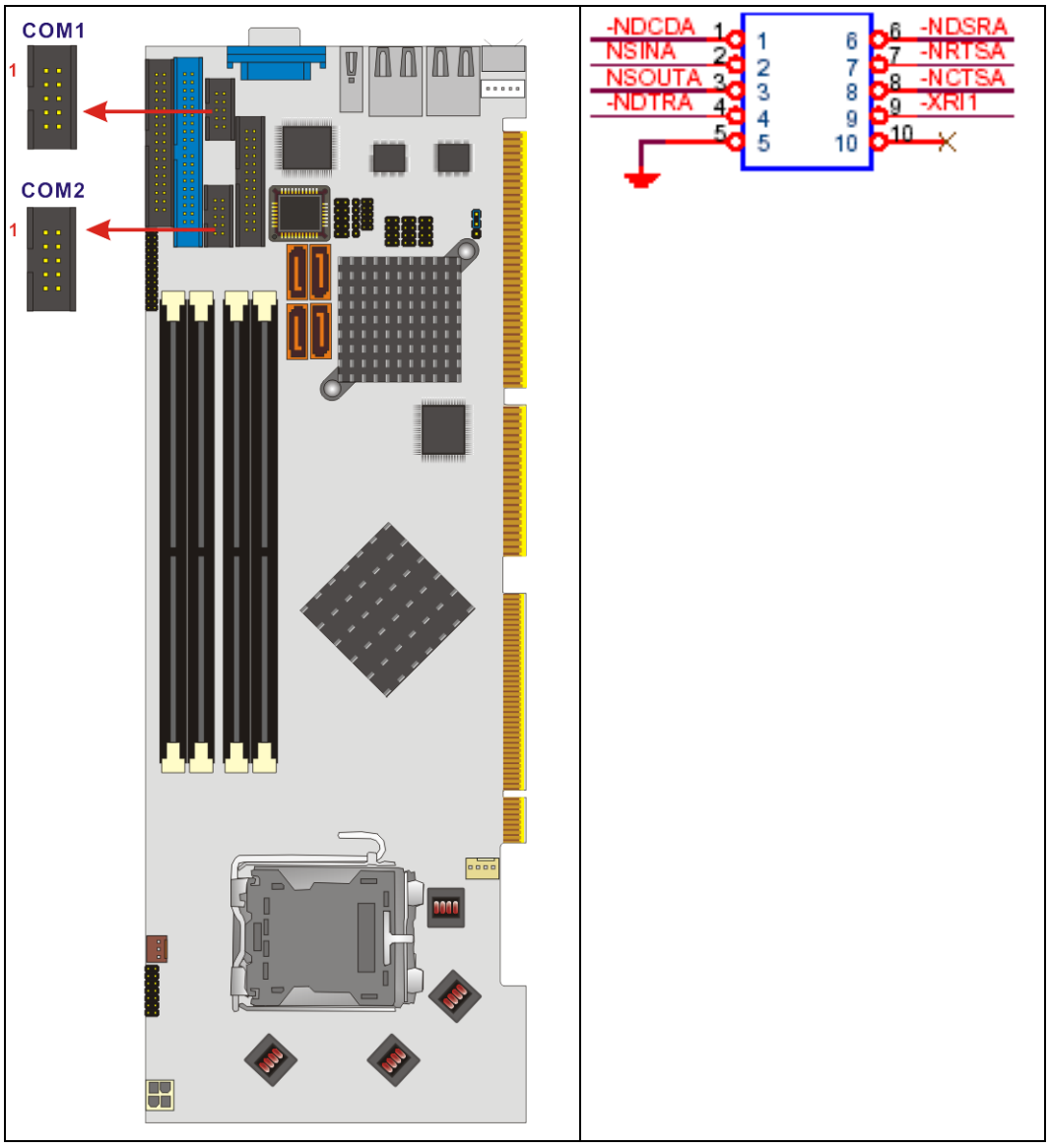

Figure 3-14: RS-232 Serial Port Connectors Location

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PIN	DESCRIPTION	PIN	DESCRIPTION
1	DATA CARRIER DETECT (DCD)	6	DATA SET READY (DSR)
2	RECEIVE DATA (RXD)	7	REQUEST TO SEND (RTS)
3	TRANSMIT DATA (TXD)	8	CLEAR TO SEND (CTS)
4	DATA TERMINAL READY (DTR)	9	RING INDICATOR (RI)
5	GND (GND)	10	GND (GND)

Table 3-16: RS-232 Serial Port Connectors Pinouts

3.2.14 SATA Drive Connectors

CN Label: **SATA1, SATA2, SATA3, SATA4**

CN Type: 7-pin SATA drive connector

CN Location: See **Figure 3-15**

CN Pinouts: See **Table 3-17**

The SATA drive ports are connect to SATA HDDs with SATA signal cables. The SATA II connectors provide connectivity with a maximum data transfer rate of 300Mb/s.

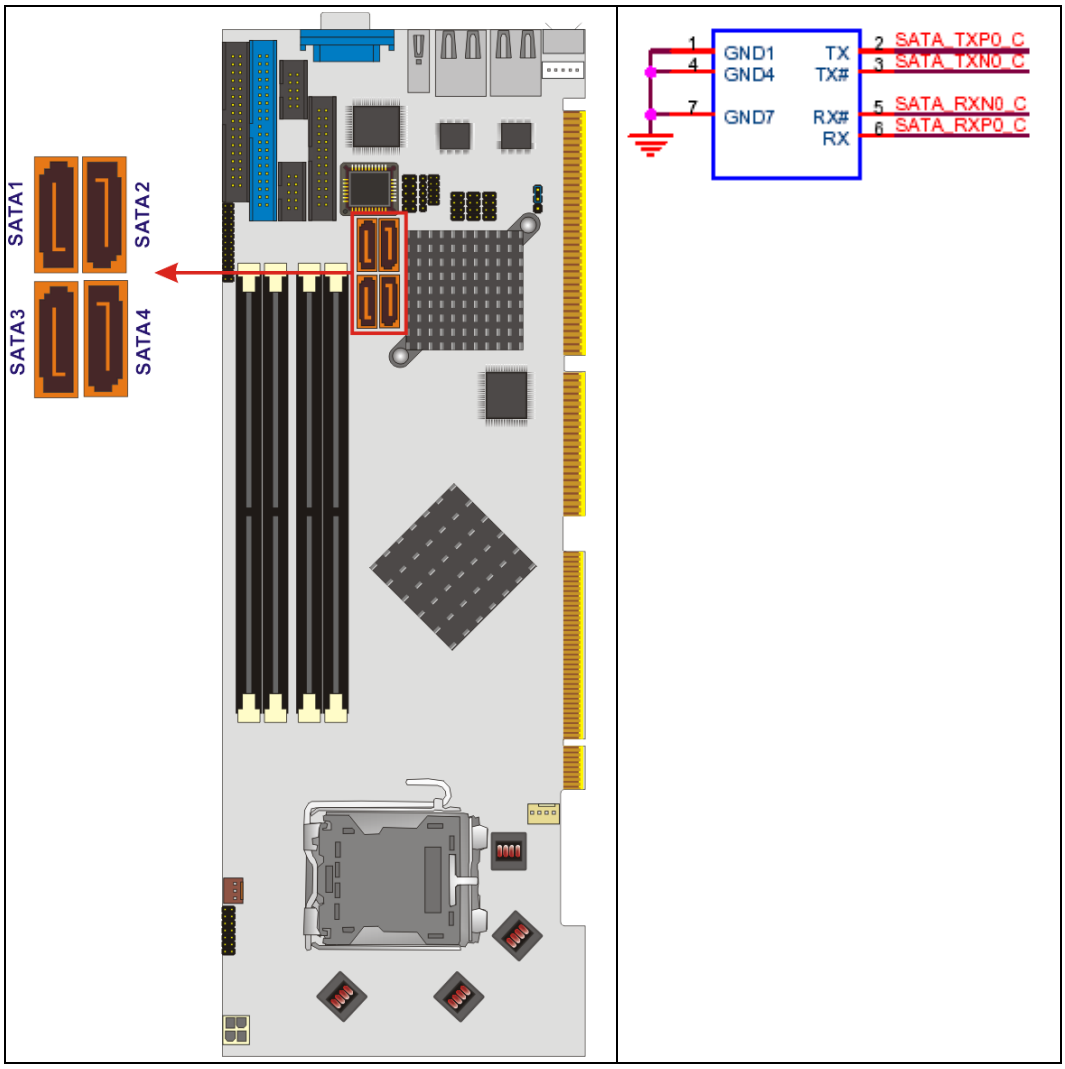

Figure 3-15: SATA Connectors Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	GND	5	RX-
2	TX+	6	RX+
3	TX-	7	GND
4	GND	8	N/C

Table 3-17: SATA Connectors Pinouts

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CAUTION:

Your SATA hard drives may come with both a 4P power connector and a SATA power interface. Attach either the 4P connector or the included SATA power cable to your SATA hard drives. ***DO NOT*** attach both the power connectors to your SATA hard drives at the same time! Doing so will cause damage.

NOTE:

1. SATA is supported by:
    - Windows® 2000 SP4
    - Windows® XP SP1
    - Windows® 2003, or later versions
2. Older OSes, such as Windows® 98SE or Me, do not support the SATA interface.

3.2.15 USB Connectors

CN Label: **USB01, USB23, USB45**

CN Type: 8-pin header

CN Location: See **Figure 3-16**

CN Pinouts: See **Table 3-18**

Three 2x4 pin connectors provide connectivity to six USB 2.0 ports. An additional USB port is found on the rear panel. The USB ports are used for I/O bus expansion.

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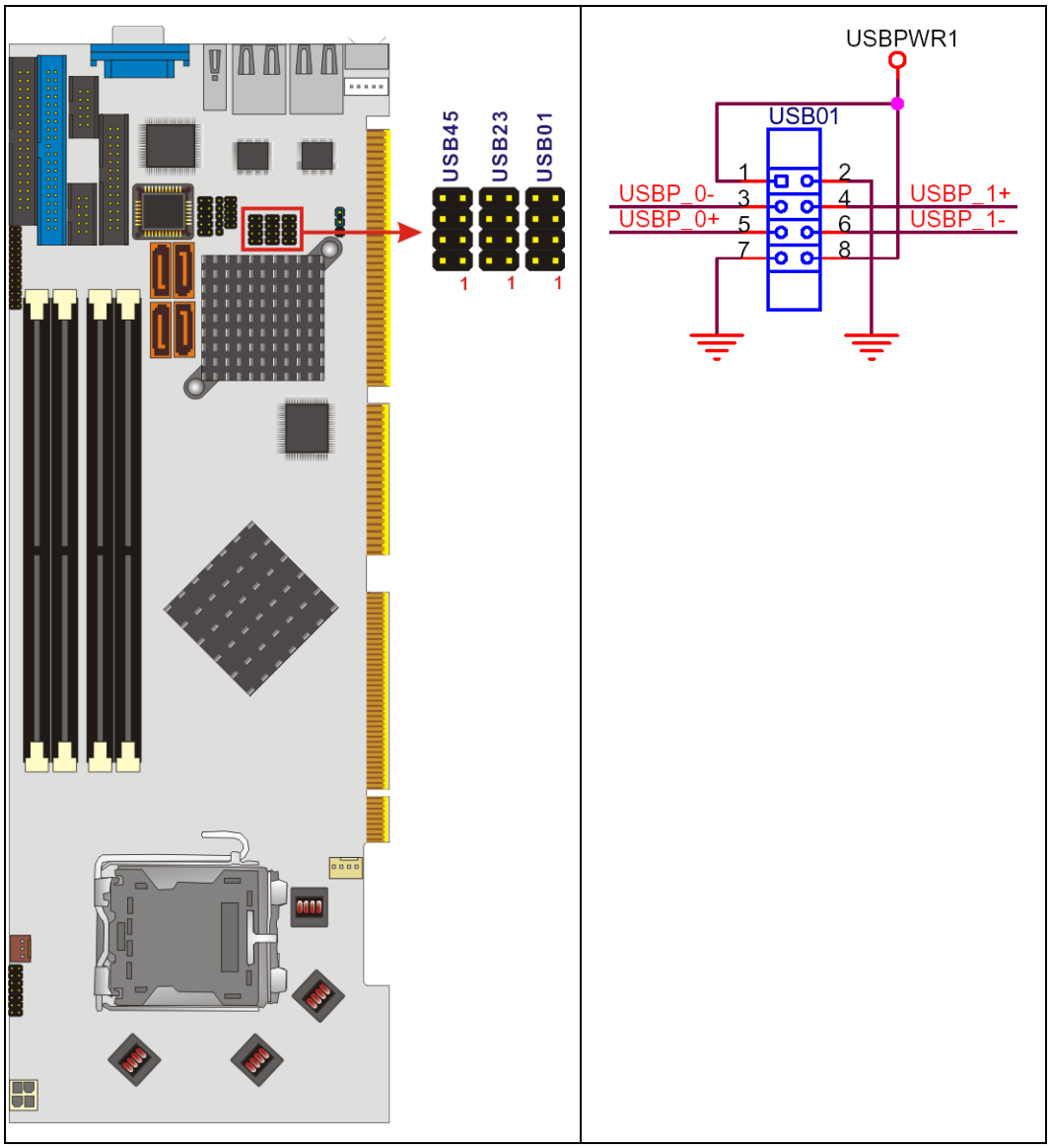

Figure 3-16: USB Port Connector Location

PIN	DESCRIPTION	PIN	DESCRIPTION
1	VCC	2	GND
3	DATA-	4	DATA+
5	DATA+	6	DATA-
7	GND	8	VCC

Table 3-18: USB Port Connector Pinouts

3.3 External Peripheral Interface Connectors

Figure 3-17 shows the CPGx Series CPU card rear panel. The peripheral connectors on the back panel can be connected to devices externally when the CPU card is installed in a chassis. The peripheral connectors on the rear panel are:

- 1 x PS/2 keyboard connector
- 1 x USB connectors
- 2 x RJ-45 GbE connectors
- 1 x VGA connector

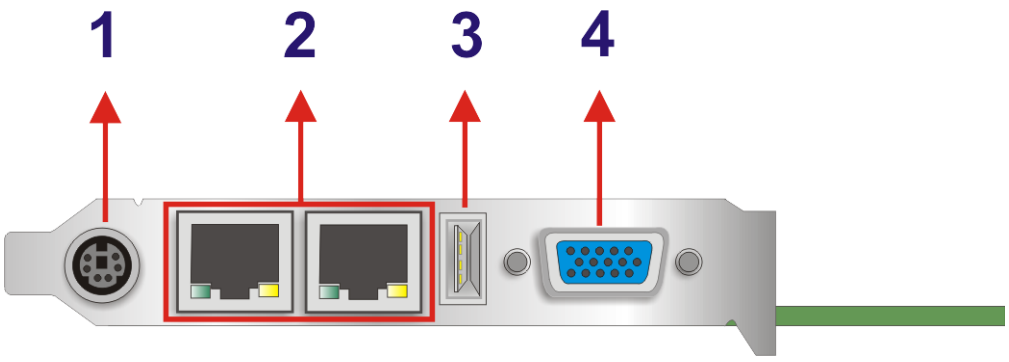

Figure 3-17: External Peripheral Interface Connector Panel

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3.3.1 LAN Connectors

CN Label: **LAN1** and **LAN2**

CN Type: RJ-45

CN Location: See **Figure 3-17** (labeled number 2)

CN Pinouts: See **Table 3-19**

The CPGx Series is equipped with two built-in GbE Ethernet controllers. The controllers can connect to the LAN through two RJ-45 LAN connectors. There are two LEDs on the connector indicating the status of LAN. The pin assignments are listed in the following table:

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	MDIA3-	MDIA1+	MDIA1+
2	MDIA3+	MDIA2+-	MDIA2+-
3	MDIA2-	MDIA0-	MDIA0-
4	MDIA1-	MDIA0+	MDIA0+

Table 3-19: LAN Pinouts

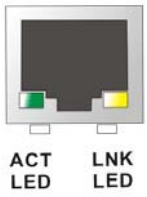

Figure 3-18: RJ-45 Ethernet Connector

The RJ-45 Ethernet connector has two status LEDs, one green and one yellow. The green LED indicates activity on the port and the yellow LED indicates the port is linked. See **Table 3-20**.

STATUS	DESCRIPTION	STATUS	DESCRIPTION
GREEN	Activity	YELLOW	Linked

Table 3-20: RJ-45 Ethernet Connector LEDs

3.3.2 Mini-DIN 6 PS/2 Connector

CN Label: **KB_MS1**

CN Type: Mini-DIN 6 PS/2

CN Location: See **Figure 3-17** (labeled number 1)

CN Pinouts: See **Table 3-21**

The CPGx Series CPU card has a mini-DIN 6 PS/2 connector on the mounting bracket for easy connection to a PS/2 keyboard or PS/2 mouse. The card comes with a cable to convert the mini-DIN 6 PS/2 into two mini-DIN 6 PS/2 connectors for keyboard and mouse connection.

Figure 3-19: Mini-DIN 6 PS/2 Connector

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PIN NO.	DESCRIPTION
1	Keyboard Data
2	Mouse Data
3	GND
4	VCC
5	Keyboard Clock
6	Mouse Clock

Table 3-21: Mini-DIN 6 PS/2 Connector

3.3.3 USB Connector

CN Label: **USB_C6**

CN Type: USB port

CN Location: See **Figure 3-17** (labeled number 3)

CN Pinouts: See **Table 3-22**

The CPGx Series has one rear panel USB port. This port connects to both USB 2.0 and USB 1.1 devices.

PIN NO.	DESCRIPTION
1	VCC
2	DATA-
3	DATA+
4	GROUND

Table 3-22: USB Port Pinouts

3.3.4 VGA connector

CN Label: **VGA1**

CN Type: HD-D-sub 15 female connector

CN Location: See **Figure 3-17** (labeled number 4)

CN Pinouts: See **Table 3-23**

A 15-pin VGA connector connects to standard displays.

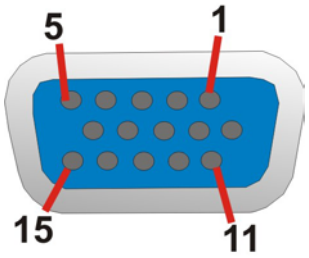

Figure 3-20: VGA Connector

PIN NO.	DESCRIPTION	PIN NO.	DESCRIPTION
1	RED	2	GREEN
3	BLUE	4	NC
5	GND	6	GND
7	GND	8	GND
9	VCC	10	GND
11	NC	12	DDCDAT
13	HSYNC	14	VSYNC
15	DDCCLK		

Table 3-23: VGA Connector Pinouts

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Chapter

4

Installation and Configuration

4.1 Anti-static Precautions

Electrostatic discharge (ESD) can cause serious damage to electronic components, including the CPGx cards. (Dry climates are especially susceptible to ESD.) It is therefore critical that whenever the CPGx Series (or any other electrical component) is handled, the following anti-static precautions are strictly adhered to.

- ***Wear an anti-static wrist band:*** Wearing a simple anti-static wrist band can help to prevent ESD from damaging the board.
- ***Self-grounding:*** Before handling the board, touch any grounded conducting material. During the time the board is handled, frequently touch any conducting materials that are connected to the ground.

4.2 Installation Considerations

NOTE:

The following installation notices and installation considerations should be read and understood before the CPU card is installed. All installation notices pertaining to the installation of the CPU card should be strictly adhered to. Failing to adhere to these precautions may lead to severe damage of the CPU card and injury to the person installing the CPU card.

4.2.1 Installation Notices

Before and during the installation of the CPGx Series CPU card, please **do** the following:

- Read the user manual
  - The user manual provides a complete description of the CPGx Series CPU card, installation instructions and configuration options.

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- Wear an electrostatic discharge cuff (ESD)
  - Electronic components are easily damaged by ESD. Wearing an ESD cuff will remove ESD from your body and help to prevent ESD damage to the CPU card.
- Place the CPU Card on an antistatic pad
  - When you are installing or configuring the CPU Card, place it on an antistatic pad. This will help to prevent potential ESD damage.
- Turn off all power to the CPU card
  - When working with the CPU card, make sure that it is disconnected from all power supplies and that no electricity is being fed into the system.

Before and during the installation of the CPGx Series CPU card **DO NOT:**

- remove any of the stickers on the PCB board. These stickers are required for warranty validation.
- use the product before you have verified that all cables and power connectors are properly connected.
- allow screws to come in contact with the PCB circuit, connector pins, or its components.

4.3 Unpacking

NOTE:

If any of the items listed below are missing when you unpack the CPGx Series CPU card, do not proceed with the installation and contact CyberResearch, Inc..

4.3.1 Unpacking Precautions

Before you install the CPGx Series, you must unpack the CPU card. Some components on CPGx Series are very sensitive to static electricity and can be damaged by a sudden rush of power. To protect it from being damage, follow these precautions:

- Ground yourself to remove any static charge before touching your CPGx Series. You can do so by wearing a grounded wrist strap at all times or by frequently touching any conducting materials that is connected to the ground.
- Handle your CPGx Series by its edges. Do not touch the IC chips, leads or circuitry if not necessary.

Do not place a PCB on top of an anti-static bag. Only the inside of the bag is safe from static discharge.

4.3.2 Checklist

When you unpack the CPGx Series, please make sure that your package contains the following items.

- 1 x CPGx Series single board computer
- 1 x Mini jumper pack
- 1 x ATA 66/100 flat cable
- 1 x Dual RS-232 cable
- 2 x SATA cables
- 1 x SATA power cable
- 1 x Keyboard/ PS2 mouse Y cable
- 1 x USB cable
- 1 x Utility CD

If one or more of these items are missing, please contact CyberResearch, Inc. and do not proceed any further with the installation.

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4.4 CPGx Series CPU Card Installation

WARNING:

Never run the CPU card without an appropriate heatsink and cooler that can be ordered from CyberResearch, Inc. or purchased separately.

Be sure to use the CPU 12V power connector (CPU12V1) for the CPU power.

WARNING:

Please note that the installation instructions described in this manual must be carefully followed in order to avoid damage to the CPU card components and injury to you.

WARNING:

When installing electronic components onto the CPU card always follow the previously outlined anti-static precautions in order to prevent ESD damage to your board and other electronic components like the CPU and DIMM modules

The following components must be installed onto the CPU card or connected to the CPU card during the installation process.

- CPU
- CPU cooling kit

- DDR2 memory modules
- Peripheral devices

4.5 Socket LGA775 CPU Installation

4.5.1 CPU Selection: HT Functionality Requirements

Enabling Hyper-Threading Technology on your system requires meeting all of the platform requirements listed below:

- **CPU**: An Intel® Pentium 4 Processor with HT Technology must be installed
- **Chipset**: An Intel® Chipset that supports HT Technology (that has been met by the CPGx Series)
- **OS**: An operating system that has optimizations for HT Technology

4.5.1.1 CPU Installation

WARNING:

CPUs are expensive and sensitive components. When installing the CPU please be careful not to damage it in anyway. Make sure the CPU is installed properly and ensure that a heat sink and CPU cooling fan are properly installed before the CPGx Series is run.

If a heat sink and cooling fan are not properly installed both the CPU and the board may be damaged.

The LGA775 socket is shown in **Figure 4-1**.

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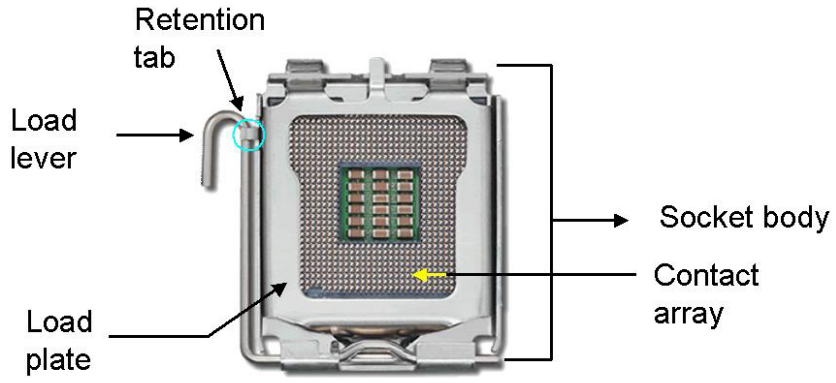

Figure 4-1: Intel® LGA775 Socket

WARNING:

When handling the CPU, only hold it on the sides. DO NOT touch the pins at the bottom of the CPU.

To install Socket LGA775 CPU onto the CPGx Series, follow the steps below:

Step 1: **Remove the protective cover.** Remove the black protective cover by prying it off the load plate. To remove the protective cover, locate the "**REMOVE**" sign and use the fingernail to pry the protective cover off. (See **Figure 4-2**)

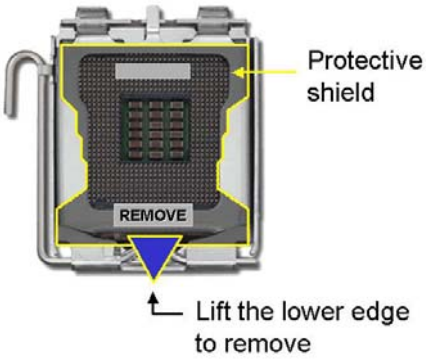

Figure 4-2: Remove the CPU Socket Protective Shield

Step 2: **Open the socket**. Disengage the load lever by pressing the lever down and slightly outward to clear the retention tab. Rotate the load lever to a fully open position. Then rotate the load plate towards the opposite direction. (See **Figure 4-3**)

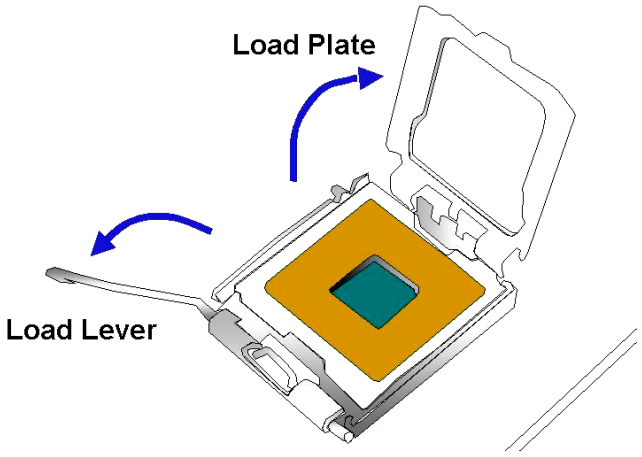

Figure 4-3: Open the CPU Socket Load Plate

Step 3: **Inspect the CPU socket** Make sure there are no bent pins and make sure the socket contacts are free of foreign material. If any debris is found, remove it with compressed air.

Step 4: **Orientate the CPU properly**. Make sure the IHS (Integrated Heat Sink) side is facing upward.

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Step 5: **Correctly position the CPU.** Match the Pin 1 mark with the cut edge on the CPU socket.

Step 6: **Align the CPU pins.** Locate pin 1 and the two orientation notches on the CPU. Carefully match the two orientation notches on the CPU with the socket alignment keys.

Step 7: **Insert the CPU.** Gently insert the CPU into the socket. If the CPU pins are properly aligned, the CPU should slide into the CPU socket smoothly. See **Figure 4-4**.

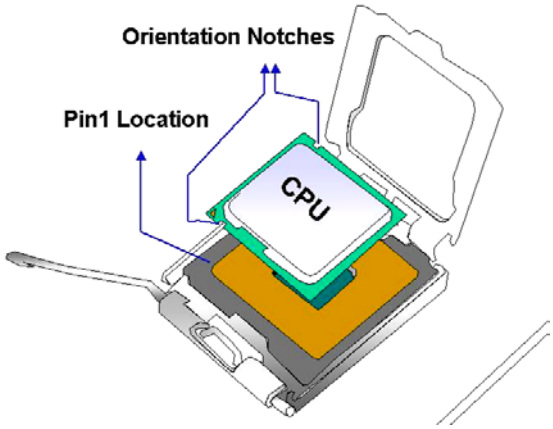

Figure 4-4: Insert the Socket LGA775 CPU

Step 8: **Close the CPU socket.** Close the load plate and engage the load lever by pushing it back to its original position. Secure the load lever under the retention tab on the side of CPU socket.

Step 9: **Connect the CPU power connector.** Connect the CPU 12V cable to the CPU 12V power connector after the cooling kit is installed.

4.5.2 Socket LGA775 Cooling Kit Installation

WARNING:

It is strongly recommended that you DO NOT use the original heat sink and cooler provided by Intel on the CPGx Series.

The CPGx Series is vertically mounted on a horizontal backplane. Intel's heat sink does not come with a support bracket on the soldering side, so the PCB may be bent by the weight of the cooling kit.

The cooling kit includes a support bracket that is combined with the heat sink mounted on the CPU to counterweigh and balance the load on both sides of the PCB.

Figure 4-5: Cooling Kit

The CPU cooling kit shown in **Figure 4-5** is comprised of a CPU heat sink and a cooling fan.

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NOTE:

Do not wipe off (accidentally or otherwise) the pre-sprayed layer of thermal paste on the bottom of the heat sink. The thermal paste between the CPU and the heat sink is important for optimum heat dissipation.

To install the cooling kit, follow the instructions below.

Step 1: **Place the cooling kit onto the socket LGA775 CPU**. Make sure the CPU cable can be properly routed when the cooling kit is installed.

Step 2: **Properly align the cooling kit**. Make sure the four spring screw fasteners can pass through the pre-drilled holes on the PCB.

Step 3: **Mount the cooling kit**. Gently place the cooling kit on top of the CPU. Make sure the four threaded screws on the corners of the cooling kit properly pass through the predrilled holes on the bottom of the PCB.

Step 4: **Secure the cooling kit**. From the solder side of the PCB, align the support bracket to the screw threads on heat sink that were inserted through the PCB holes. (See **Figure 4-6**)

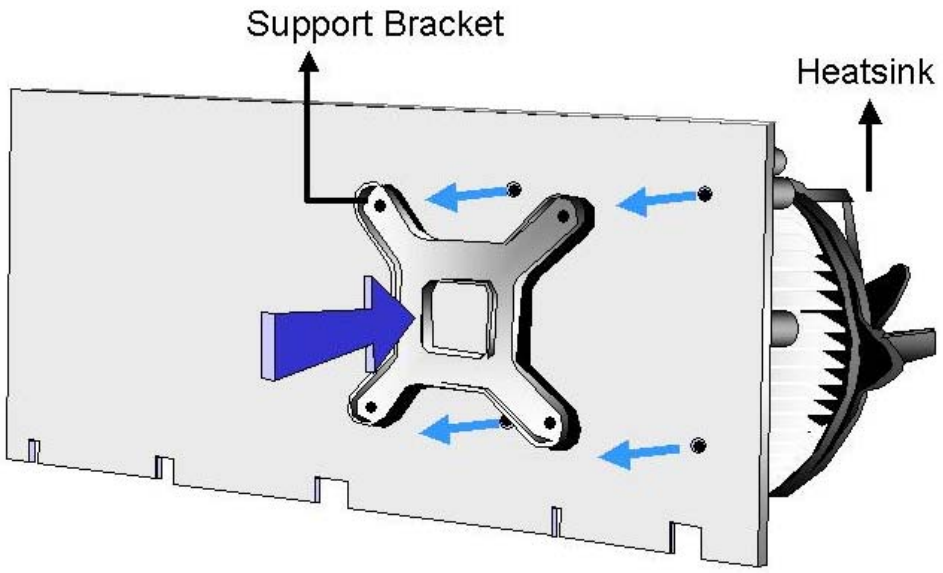

Figure 4-6: Securing the Heat sink to the PCB

Step 5: **Tighten the screws**. Use a screwdriver to tighten the four screws. Tighten each nut a few turns at a time and do not over-tighten the screws.

Step 6: **Connect the fan cable**. Connect the cooling kit fan cable to the fan connector on the CPGx Series. Carefully route the cable and avoid heat generating chips and fan blades.

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4.5.3 DIMM Module Installation

4.5.3.1 Purchasing the Memory Module

WARNING:

When purchasing the DIMM modules, make sure the modules are compatible with the DIMM slot specified in **Section 2.6 Memory Support**.

WARNING:

The board supports DDR2 DIMM modules only. DDR1 and DDR2 are not compatible. If a DDR1 DIMM module is installed, the system may be damaged and become inaccessible. Please only use DDR2 DIMM modules.

When you purchase your DIMM modules, the following considerations should be taken into account:

- Each DIMM socket can support DIMM modules with a maximum size of 1GB
- Only use DDR2 memory chips in the DIMM slots
- It is recommended that you use memory modules of identical brand, size, chips, and speed.
- DIMMs must use the same density memory chips
- Both DIMMs must use the same DRAM bus width
- Both DIMMs must be either single-sided or dual-sided

4.5.3.2 DIMM Module Installation

The CPGx Series CPU card has four 240-pin DDR2 SDRAM DIMM sockets. To install the DIMM modules, follow the instructions below.

Step 1: Make sure the two handles of the DIMM socket are in the "open" position, leaning outward (**Figure 4-7**).

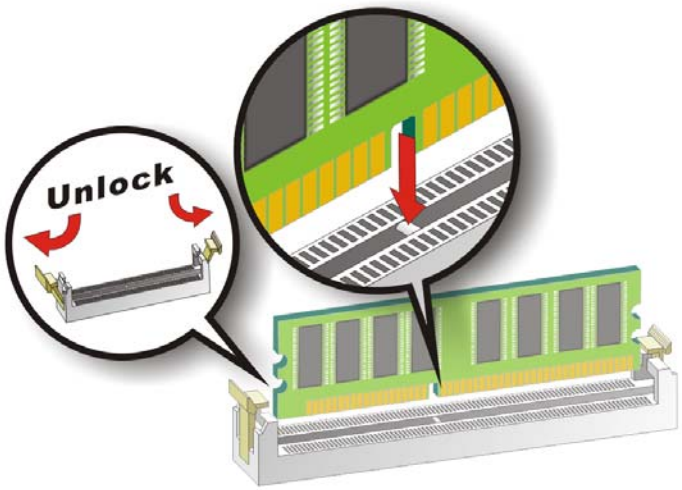

Figure 4-7: Installing the DIMM Module

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Step 2: Slowly slide the DIMM module along the plastic guides on both ends of the socket. Press the DIMM module down into the socket until it clicks into position and the two handles have automatically locked the memory module into place.

Step 3: To remove the memory module, push both handles outward, and the memory module is ejected by the mechanism in the socket.

4.5.4 Peripheral Device Connection

Provided cables that connect peripheral devices to the CPU Card are listed in **Table 4-1**. Cables not included in the kit must be separately purchased.

Quantity	Type
1	ATA 66/100 flat cable
2	SATA cables
1	SATA power cable
1	Keyboard/ PS2 mouse Y cable
1	RS-232 cable
1	USB cable

Table 4-1: Provided Cables

4.5.4.1 IDE Drive Connector (PIDE1)

The cable used to connect the motherboard to the IDE device is a standard 40-pin ATA/100 flat cable. To connect an IDE device to the motherboard, follow the instructions below.

Step 1: Find the IDE flat cable in the kit that came with the motherboard.

Step 2: Connect one end of the cable to the IDE connector on the motherboard. A keyed pin on the IDE connector prevents it from being connected incorrectly.

Step 3: Locate the red wire on the other side of the cable that corresponds to the pin 1 connector.

Step 4: Connect the other side of the cable to the IDE device making sure that the pin 1 cable corresponds to pin 1 on the connector.

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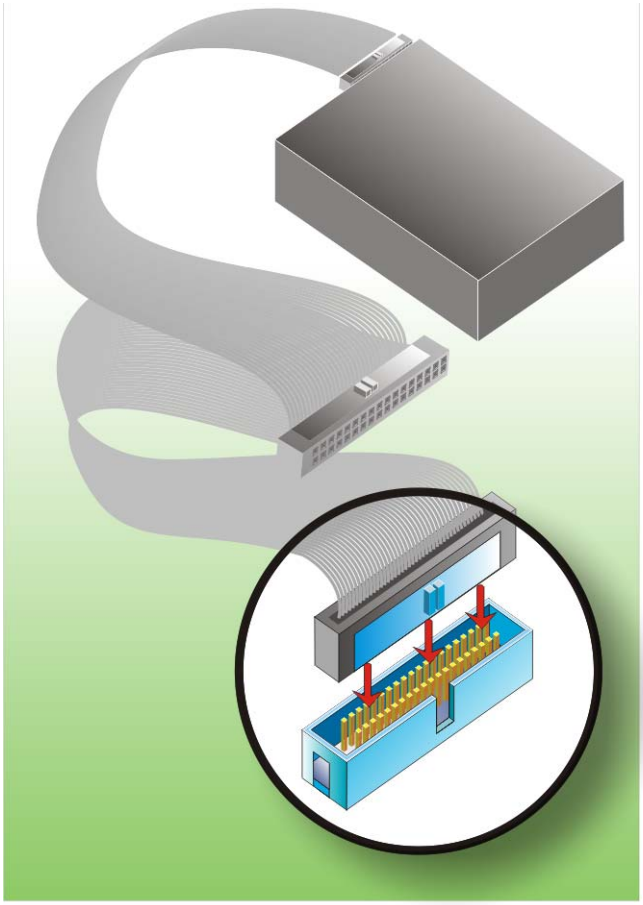

Figure 4-8: Connection of IDE Connector

NOTE:

When two IDE disk drives are connected together, back-end jumpers on the drives must be used to configure one drive as a master and the other as a slave.

4.5.4.2 Floppy Drive Connector (FDD1)

This connector provides access to an externally mounted 3.5” floppy drive. To connect the CPU Card to a FDD, follow the instructions below.

Step 1: Insert one side of the cable into the FDC making sure that the red wire on the cable corresponds to pin 1 on the connector.

Step 2: Attach the connector on the other side of the cable to the floppy drive(s). You can only use one connector in the set. The connection sequence determines which of the two connected floppy drives is drive A: and which is drive B.

4.5.4.3 SATA Drive Connection

The CPU card has on-board SATA drive connectors. Refer to **Table 1-1:** for model variations supporting two or four SATA II connectors. To connect the SATA drives to the connectors, follow the steps below.

Step 1: Locate the SATA drive connector on the board.

Step 2: Press the clip on the connector at the end of the SATA cable and insert the cable connector into the on-board SATA drive connector (**Figure 4-9**).

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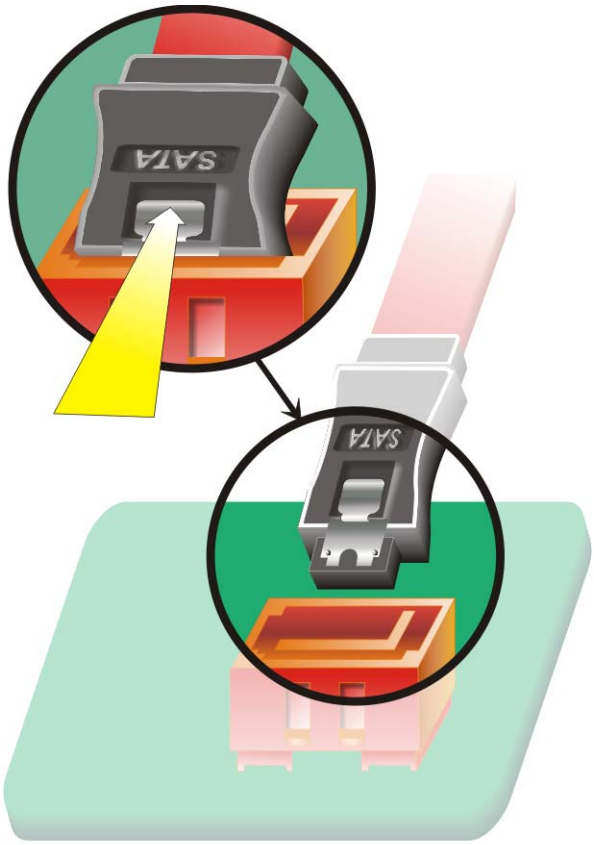

Figure 4-9: SATA Drive Cable Connection

Step 3: Connect the connector on the other end of the cable to the connector at the back of the SATA drive (**Figure 4-10**).

Step 4: Connect the SATA power connector to the back of the SATA drive (**Figure 4-10**).

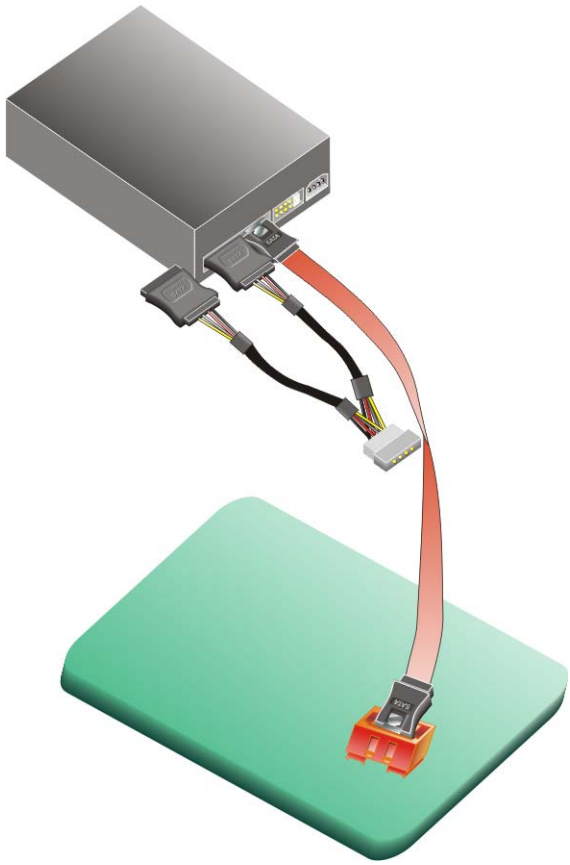

Figure 4-10: SATA Drive Connection

4.5.4.4 Installing the RS-232 Cable

A dual RS-232 cable consisting of two cables attached to two D-sub 9 male connectors that are mounted onto a bracket can be connected to the COM1 and COM2 RS-232 connectors. To install an RS-232 cable, follow the steps below.

Step 1: Locate the two RS-232 serial port connectors.

Step 2: Insert the two small connectors on the cables into the serial port box headers on the CPU card (**Figure 4-11**).

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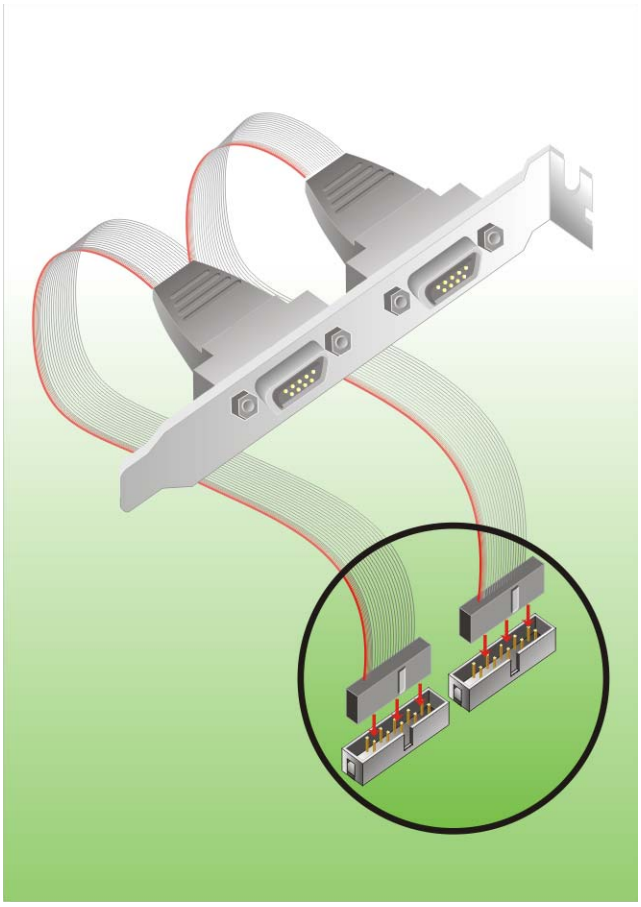

Figure 4-11: Dual RS-232 Cable Installation

Step 3: Secure the bracket supporting the two D-sub 9 male connectors to the chassis. To do this, refer to the chassis manual.

4.5.4.5 USB 2.0 Cable Connection

The CPU card is shipped with a dual USB cable. The dual USB cable consists of two connectors attached to two independent cables. Each cable is then attached to a USB port connector that is mounted on a bracket. To install the USB cable, follow the steps below.

Step 1: Install a USB module supporting two USB ports to the chassis. Secure the USB module bracket following the instructions in the documentation that came with the USB module and the chassis.

Step 2: Insert the two 4-pin connectors from the module into the USB pin headers on the CPU card. (**Figure 4-12**)

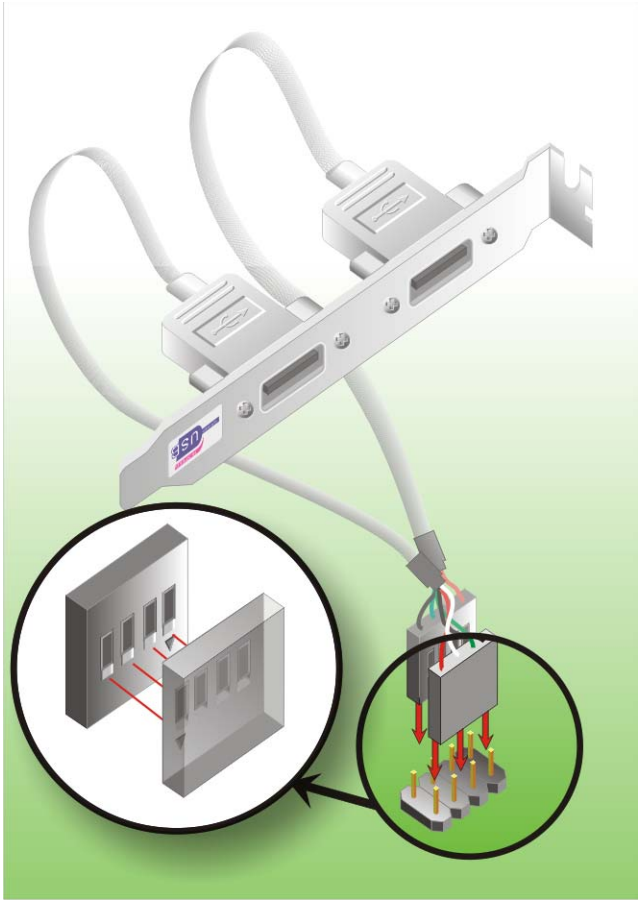

Figure 4-12: USB Cable Installation

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4.6 On-board Jumper

NOTE:

A jumper is a metal bridge that is used to close an electrical circuit. It consists of two metal pins and a small metal clip (often protected by a plastic cover) that slides over the pins to connect them. To CLOSE/SHORT a jumper means connecting the pins of the jumper with the plastic clip and to OPEN a jumper means removing the plastic clip from a jumper.

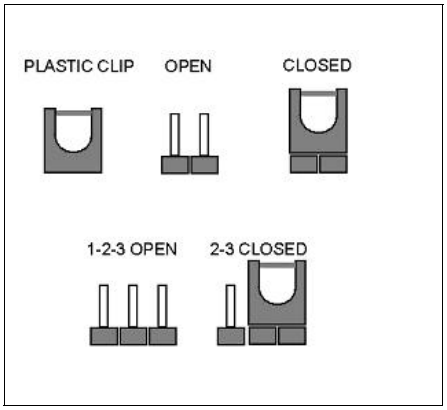

Figure 4-13 Jumper

The CPU card one on-board jumper. The jumper is described in **Table 4-2**.

Label	Connector	Type
J_CMOS1	CMOS state setting	3-pin header

Table 4-2: On-board Jumpers

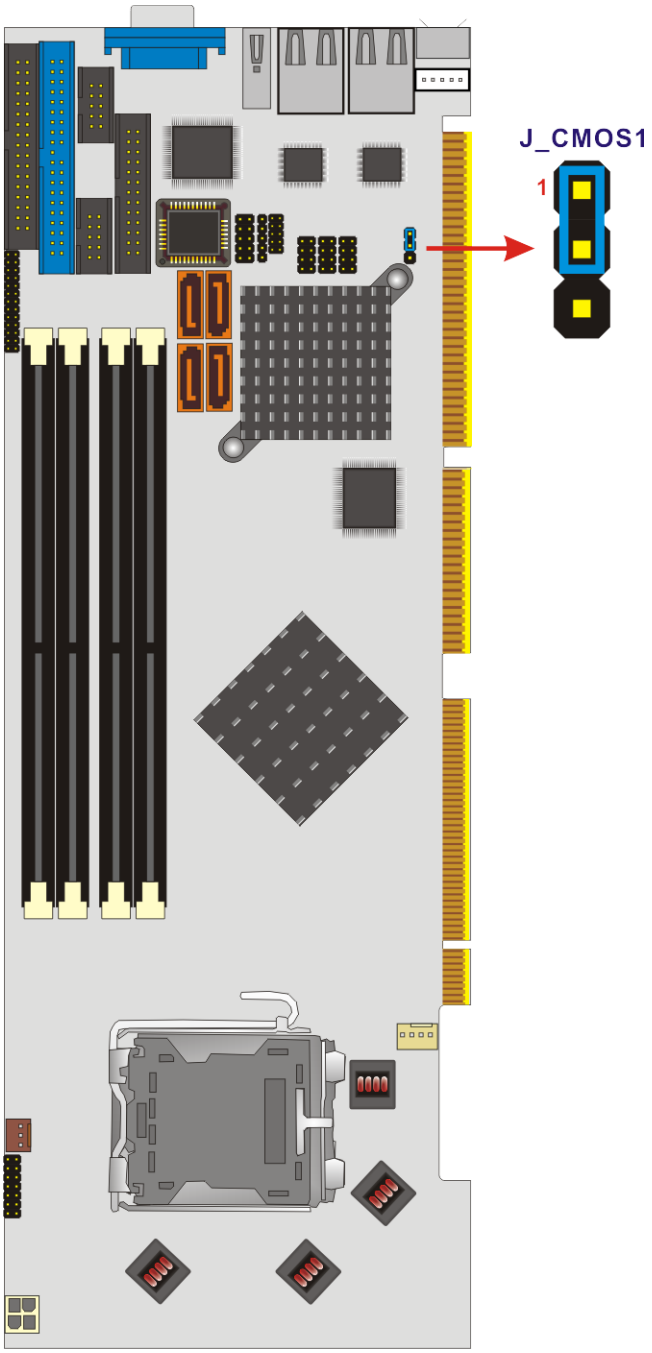

Figure 4-14: Jumper Locations

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4.6.1 Clear CMOS Jumper

Jumper Label: **J_CMOS1**

Jumper Type: 3-pin header

Jumper Settings: See **Table 4-3**

Jumper Location: See **Figure 4-14**

If the CPU card fails to boot due to improper BIOS settings, use this jumper to clear the CMOS data and reset the system BIOS information. To do this, use the jumper cap to close pins 2 and 3 for a few seconds then reinstall the jumper clip back to pins 1 and 2.

If the "CMOS Settings Wrong" message is displayed during the boot up process, the fault may be corrected by pressing the F1 to enter the CMOS Setup menu. Do one of the following:

- Enter the correct CMOS setting
- Load Optimal Defaults
- Load Failsafe Defaults.

After having done one of the above, save the changes and exit the CMOS Setup menu.

J_CMOS1	DESCRIPTION
Short 1-2 (Default)	Normal Operation
Short 2-3	Clear CMOS Setup

Table 4-3: Clear CMOS Jumper Settings

4.7 Chassis Installation

After the CPU, the cooling kit, and the DIMM modules have been installed and after the internal peripheral connectors have been connected to the peripheral devices and the jumpers have been configure, the CPU card can be mounted into a chassis.

To mount the CPU card into a chassis please refer to the chassis user guide that came with the product.

4.8 Rear Panel Connectors

4.8.1 Keyboard and Mouse Connection

A PS/2 keyboard and a PS/2 mouse can be connected to the appropriate PS/2 connector on the rear panel.

4.8.2 VGA Port Installation

The cable used to connect the motherboard to a VGA port is a 10-pin header to female HD-D-sub 15 connector. To connect a VGA port to the motherboard, follow the instructions below.

Step 1: Connect a standard male HD-D-sub 15 connector end to the VGA connector on the rear panel.

Step 2: Connect the other end to a display device.

4.8.3 Ethernet Connection

The rear panel RJ-45 connectors can be connected to an external LAN and communicate with data transfer rates up to 1Gb/s.

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4.8.4 USB Connection

The rear panel USB connector provides easier and quicker access to external USB devices. The rear panel USB connector is a standard connector and can easily be connected to other USB devices.

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Chapter

5

AMI BIOS Setup

5.1 Introduction

A licensed copy of AMI BIOS is preprogrammed into the ROM BIOS. The BIOS setup program allows users to modify the basic system configuration. This chapter describes how to access the BIOS setup program and the configuration options that may be changed.

5.1.1 Starting Setup

The AMI BIOS is activated when the computer is turned on. The setup program can be activated in one of two ways.

1. Press the **DELETE** key as soon as the system is turned on or
2. Press the **DELETE** key when the "**Press Del to enter SETUP**" message appears on the screen.

If the message disappears before, restart the computer and try again.

5.1.2 Using Setup

Use the arrow keys to highlight items, press **ENTER** to select, use the "+" and "-" keys to change entries, press **F1** for help and press **ESC** to quit. Navigation keys are shown in **Table 5-1**.

Key	Function
Up arrow	Move to previous item
Down arrow	Move to next item
Left arrow	Move to the item on the left hand side
Right arrow	Move to the item on the right hand side
Esc key	Main Menu – Quit and not save changes into CMOS Status Page Setup Menu and Option Page Setup Menu -- Exit current page and return to Main Menu
"+" key	Increase the numeric value or make changes
"-" key	Decrease the numeric value or make changes

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F1 key	General help, only for Status Page Setup Menu and Option Page Setup Menu
F2 /F3 key	Change color from total 16 colors. F2 to select color forward.
F10 key	Save all the CMOS changes, only for Main Menu

Table 5-1: BIOS Navigation Keys

5.1.3 Getting Help

When **F1** is pressed a small help window describing the appropriate keys to use and the possible selections for the highlighted item appears. To exit the Help Window press **Esc** or the **F1** key again.

5.1.4 Unable to Reboot after Configuration Changes

If the computer cannot boot after changes to the system configuration is made, CMOS defaults. Use the jumper described in **Chapter 4**, **Section 4.6.1**.

5.1.5 BIOS Menu Bar

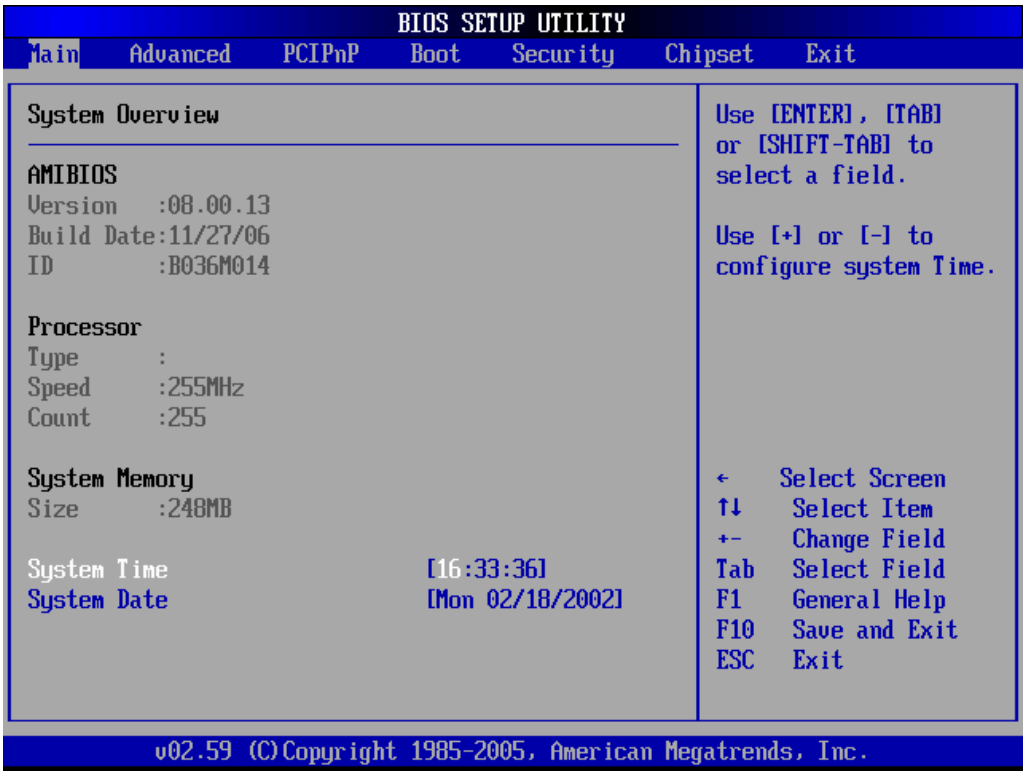
The **menu bar** on top of the BIOS screen has the following main items:

- **Main** Changes the basic system configuration.
- **Advanced** Changes the advanced system settings.
- **PCIPnP** Changes the advanced PCI/PnP Settings
- **Boot** Changes the system boot configuration.
- **Security** Sets User and Supervisor Passwords.
- **Chipset** Changes the chipset settings.
- **Exit** Selects exit options and loads default settings

The following sections completely describe the configuration options found in the menu items at the top of the BIOS screen and listed above.

5.2 Main

When the **BIOS Setup** program is entered, the **Main** menu (**BIOS Menu 1**) appears. The **Main** menu gives an overview of the basic system information.



BIOS Menu 1: Main

➔ System Overview

The **System Overview** lists a brief summary of different system components. The fields in **System Overview** cannot be changed. The items shown in the system overview include:

- **AMI BIOS**: Displays auto-detected BIOS information
  - **Version**: Current BIOS version
  - **Build Date**: Date the current BIOS version was made
  - **ID**: Installed BIOS ID

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- **Processor**: Displays auto-detected CPU specifications
  - **Type**: Names the currently installed processor
  - **Speed**: Lists the processor speed
  - **Count**: The number of CPUs on the motherboard
- **System Memory**: Displays the auto-detected system memory.
  - **Size**: Lists memory size

The **System Overview** field also has two user configurable fields:

- **System Time [xx:xx:xx]**: The system time is set here.
- **System Date [Day xx/xx/xxxx]**: The system date is set here.

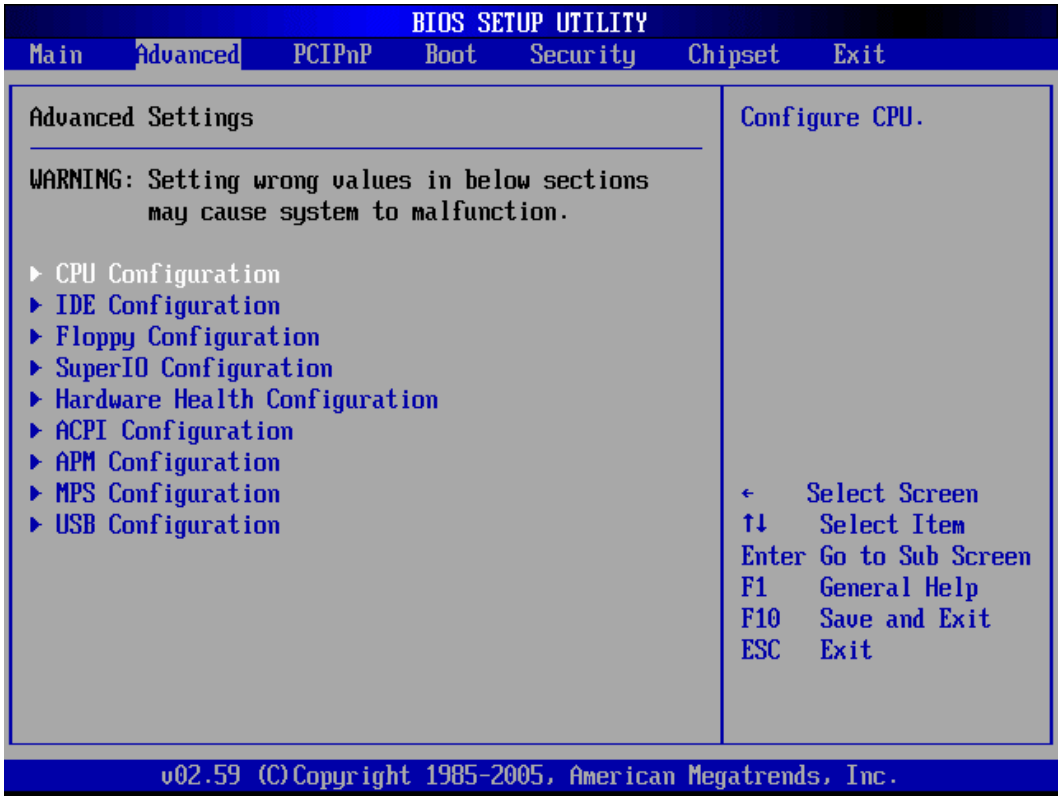
5.3 Advanced

The **Advanced** menu (**BIOS Menu 2**) allows access to the CPU and peripheral device configuration options through the following sub-menus:

WARNING:

Setting the wrong values in the sections below may cause the system to malfunction. Make sure that the settings made are compatible with the hardware.

- **CPU Configuration** (see Section 5.3.1)
- **IDE Configuration** (see Section 5.3.2)
- **Floppy Configuration** (see Section 5.3.3)
- **SuperIO Configuration** (see Section 5.3.4)
- **Hardware Health Configuration** (see Section 5.3.5)
- **ACPI Configuration** (see Section 5.3.6)
- **APM Configuration** (see Section 5.3.7)
- **MPS Configuration** (see Section 5.3.8)
- **USB Configuration** (see Section 5.3.9)



BIOS Menu 2: Advanced

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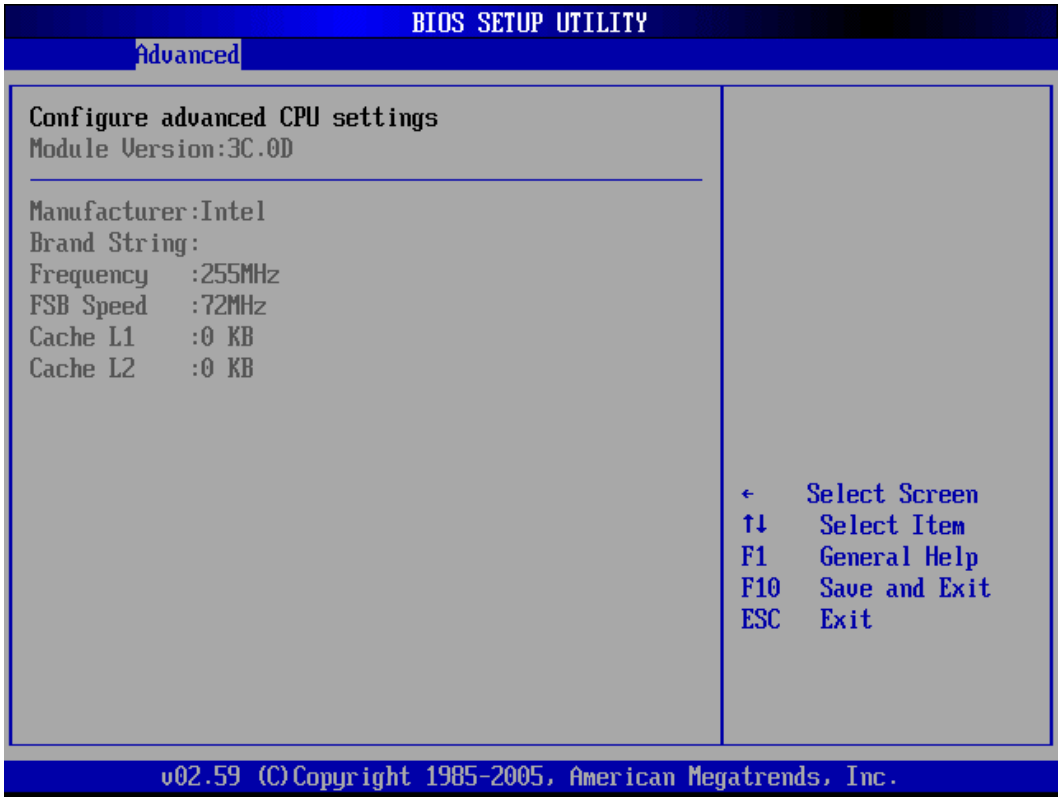
5.3.1 CPU Configuration

The **CPU Configuration** menu (**BIOS Menu 3**) shows detailed CPU specifications and CPU configuration options.



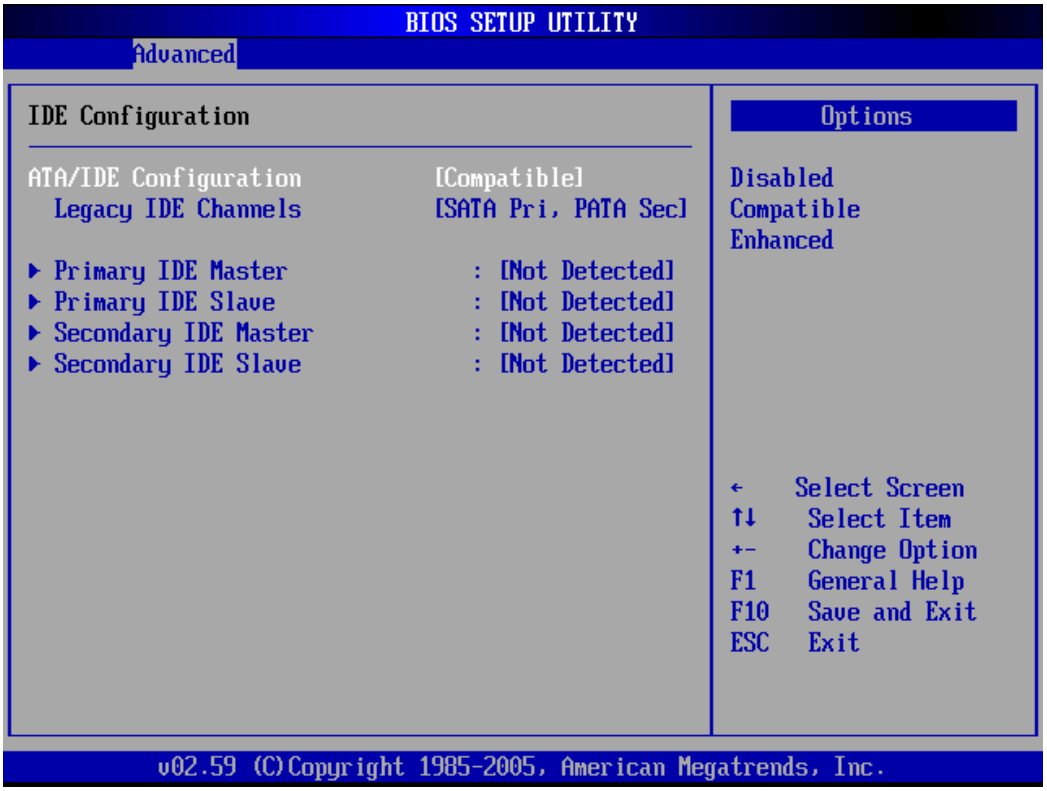
BIOS Menu 3: CPU Configuration

The CPU Configuration menu (**BIOS Menu 3**) lists the following CPU details:

- **Manufacturer**: Lists the name of the CPU manufacturer
- **Brand String**: Lists the brand name of the CPU being used
- **Frequency:** Lists the CPU processing speed
- **FSB Speed**: Lists the FSB speed
- **Cache L1**: Lists the CPU L1 cache size
- **Cache L2**: Lists the CPU L2 cache size

5.3.2 IDE Configuration

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system.



BIOS Menu 4: IDE Configuration

➔ **ATA/IDE Configuration [Compatible]**

The **ATA/IDE Configuration** BIOS option allows the user to configure the ATA/IDE device mode.

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➔ **Disabled** Disable all ATA/IDE ports. No Primary/Secondary IDE mode is presented for configuration

➔ **Compatible** DEFAULT Up to 4 HDDs can be used, two for SATA and the other for PATA IDE. If this option is selected, "Legacy IDE Channels" option is presented for configuration.

➔ **Enhanced** If this option is selected, "Configure SATA as" and "Configure SATA channels" options are presented for configuration.

➔ **Legacy IDE Channels [SATA Pri, PATA Sec]**

Use the **Legacy IDE Channels** option configures PATA and SATA resources for operating systems that require legacy IDE operation.

➔ **SATA Only** Enable up to two SATA devices

➔ **PATA Pri, SATA Sec** This option allows the system to access the primary IDE devices before the SATA devices

➔ **SATA Pri, PATA Sec** DEFAULT This option allows the system to access the SATA devices before the primary IDE devices

➔ **PATA Only** Enable the two primary IDE devices. Select this option only when the two primary IDE devices are available

➔ **IDE Master and IDE Slave**

When entering setup, BIOS auto detects the presence of IDE devices. This displays the status of the auto detected IDE devices. The following IDE devices are detected and are shown in the **IDE Configuration** menu:

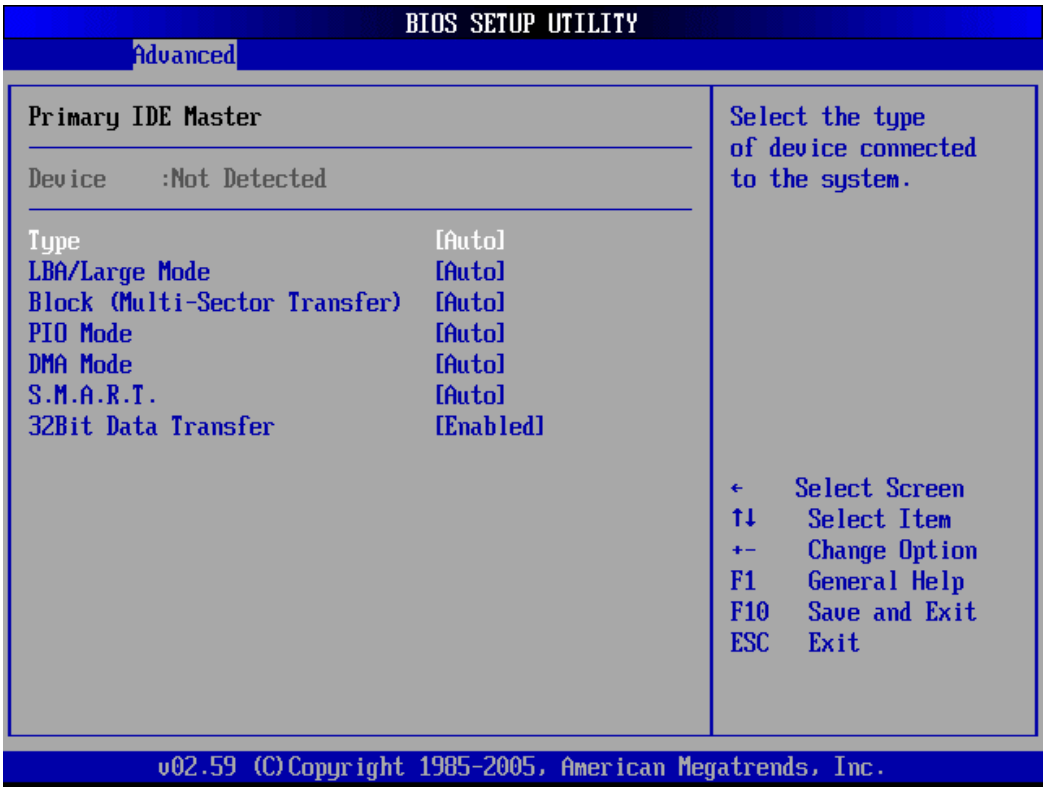
- Primary IDE Master

- Primary IDE Slave
- Secondary IDE Master
- Secondary IDE Slave

The **IDE Configuration** menu (**BIOS Menu 4**) allows changes to the configurations for the IDE devices installed in the system. If an IDE device is detected, and one of the above listed four BIOS configuration options are selected, the IDE configuration options shown in **Section 5.3.2.1** appear.

5.3.2.1 IDE Master, IDE Slave

IDE Master and IDE Slave configuration options for both primary and secondary IDE devices are shown in the BIOS menu below.



BIOS Menu 5: IDE Master and IDE Slave Configuration

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➔ **Type [Auto]**

The **Type** BIOS option determines the type of device that the AMIBIOS attempts to boot from after the Power-On Self-Test (POST) has completed.

➔ **Not Installed** Selecting this value prevents the BIOS from searching for an IDE disk drive on the specified channel.

➔ **Auto** DEFAULT This selection enables the BIOS to auto detect the IDE disk drive type attached to the specified channel. This setting should be used if an IDE hard disk drive is attached to the specified channel.

➔ **CD/DVD** The CD/DVD option specifies that an IDE CD-ROM drive is attached to the specified IDE channel. The BIOS does not attempt to search for other types of IDE disk drives on the specified channel.

➔ **ARMD** This option specifies an ATAPI Removable Media Device. These include, but are not limited to:

- ➔ **ZIP**
- ➔ **LS-120**

➔ **LBA/Large Mode [Auto]**

The **LBA/Large Mode** BIOS option disables or auto detects LBA (Logical Block Addressing). LBA is a method of addressing data on a disk drive. In LBA mode, the maximum drive capacity is 137 GB.

➔ **Disabled** This selection prevents the BIOS from using the LBA mode control on the specified channel.

➔ **Auto** DEFAULT This option allows the BIOS to auto detect the LBA mode control on the specified channel.

➔ **Block (Multi Sector Transfer) [Auto]**

➔ **Disabled** Selecting this option prevents the BIOS from using Multi-Sector Transfer on the specified channel. The data to and from the device occurs one sector at a time.

➔ **Auto** DEFAULT Selecting this value to allows the BIOS to auto detect the device support for Multi-Sector Transfers on the specified channel. If supported. Select this value to allow the BIOS to auto detect the number of sectors per block for transfer from the hard disk drive to the memory. The data transfer to and from the device occurs multiple sectors at a time.

➔ **PIO Mode [Auto]**

The **PIO Mode** option selects the IDE PIO (Programmable I/O) mode program timing cycles between the IDE drive and the programmable IDE controller. As the PIO mode increases, the cycle time decreases.

➔ **Auto** DEFAULT This setting allows the BIOS to auto detect the PIO mode. Use this value if the IDE disk drive support cannot be determined.

➔ **0** PIO mode 0 selected with a maximum transfer rate of 3.3MBps

➔ **1** PIO mode 1 selected with a maximum transfer rate of 5.2MBps

➔ **2** PIO mode 2 selected with a maximum transfer rate of 8.3MBps

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➔ **3** PIO mode 3 selected with a maximum transfer rate of 11.1MBps

➔ **4** PIO mode 4 selected with a maximum transfer rate of 16.6MBps

(This setting generally works with all hard disk drives manufactured after 1999. For other disk drives, such as IDE CD-ROM drives, check the specifications of the drive.)

➔ **DMA Mode [Auto]**

The **DMA Mode** BIOS selection adjusts the DMA mode options.

➔ **Auto** DEFAULT The BIOS auto detects the DMA mode. Use this value if the IDE disk drive support cannot be determined.

➔ **S.M.A.R.T [Auto]**

The Self-Monitoring Analysis and Reporting Technology (SMART) feature can help predict impending drive failures. The **S.M.A.R.T** BIOS option enables or disables this function.

➔ **Auto** DEFAULT BIOS to auto detects if the hard disk drive supports S.M.A.R.T. Use this setting if the IDE disk drive support cannot be determined.

➔ **Disabled** Select this value to prevent the BIOS from using the SMART feature.

➔ **Enabled** Select this value to allow the BIOS to use the SMART feature on support hard disk drives.

➔ **32Bit Data Transfer [Enabled]**

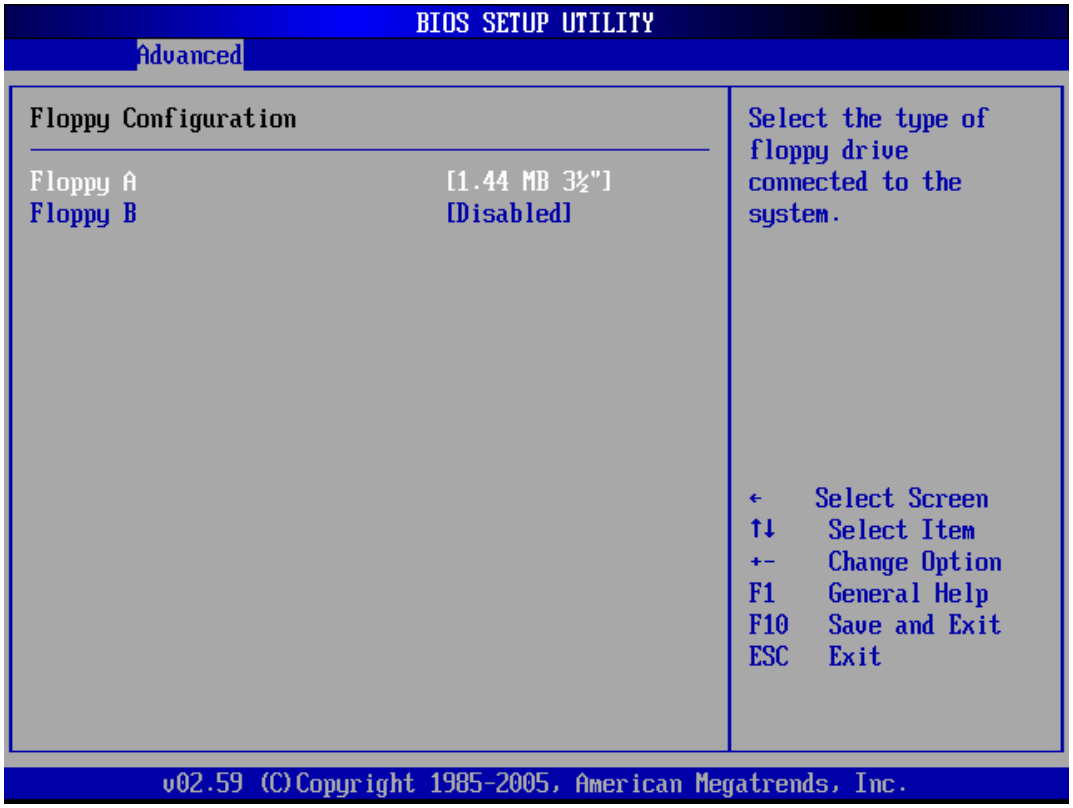
The **32Bit Data Transfer** BIOS option enables or disables 32-bit data transfers.

➔ **Disabled** Prevents the BIOS from using 32-bit data transfers.

➔ **Enabled** DEFAULT Allows BIOS to use 32-bit data transfers on support hard disk drives.

5.3.3 Floppy Configuration

Use the **Floppy Configuration** menu (**BIOS Menu 6**) to set or change the configurations for floppy disk drives.



BIOS Menu 6: Floppy Configuration

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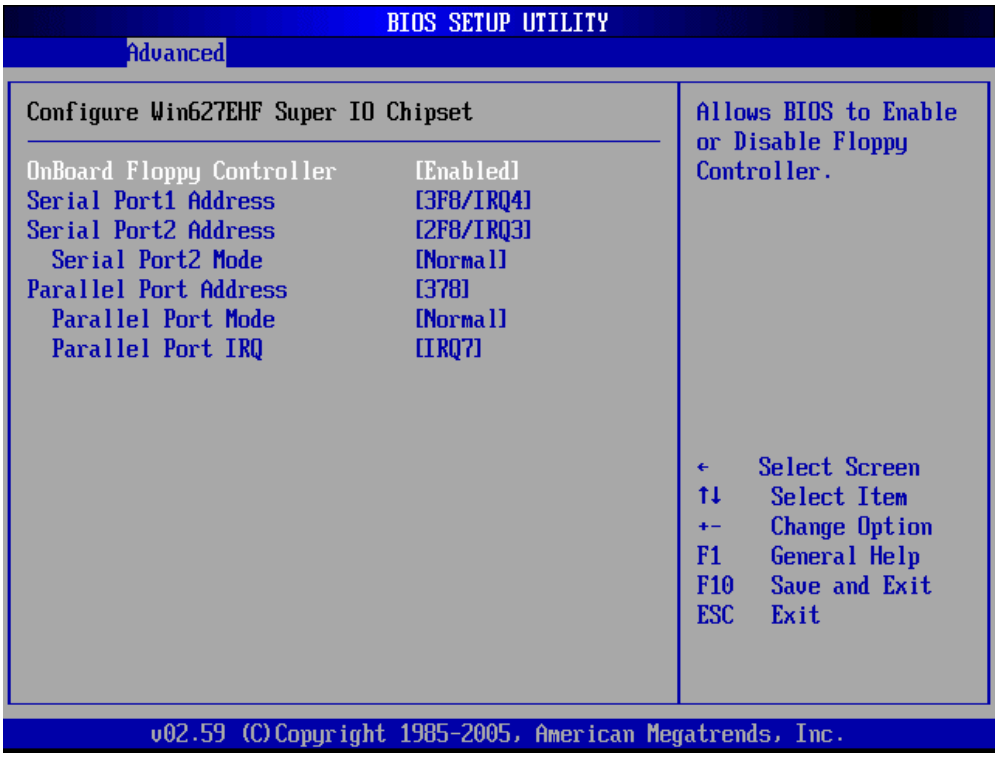
➔ **Floppy A/B [1.44 MB 3½"]**

The **Floppy A/B** configuration option determines the types of the floppy drive installed in the system. The following configuration options are available.

- Disabled
- 360 KB 5¼"
- 1.2 MB 5¼"
- 720 KB 3 ½"
- 1.44 MB 3½"
- 2.88 MB 3½"

5.3.4 Super IO Configuration

The **Super IO Configuration** menu (**BIOS Menu 7**) sets or changes the configurations for the FDD controllers, parallel ports and serial ports.



BIOS Menu 7: Super IO Configuration

➔ **On-board Floppy Controller [Enabled]**

Use the **On-board Floppy Controller** to enable or disable the floppy controller. If a floppy disk is not being used in the system, disabling this option frees up system resources that can be redirected elsewhere in the system.

➔ **Disabled**		Allows BIOS to disable the floppy controller
➔ **Enabled**	DEFAULT	Allows BIOS to enable the floppy controller

➔ **Serial Port1 Address [3F8/IRQ4]**

The **Serial Port1 Address** option allows BIOS to select the Serial Port 1 base address.

➔ **Disabled**		No base address is assigned to Serial Port 1
➔ **3F8/IRQ4**	DEFAULT	Serial Port 1 I/O port address is 3F8 and the interrupt address is IRQ4
➔ **3E8/IRQ4**		Serial Port 1 I/O port address is 3E8 and the interrupt address is IRQ4
➔ **2E8/IRQ3**		Serial Port 1 I/O port address is 2E8 and the interrupt address is IRQ3

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➔ **Serial Port2 Address [2F8/IRQ3]**

The **Serial Port2 Address** option allows BIOS to select the Serial Port 2 base address.

➔ **Disabled**		No base address is assigned to Serial Port 2
➔ **2F8/IRQ3**	DEFAULT	Serial Port 2 I/O port address is 3F8 and the interrupt address is IRQ3
➔ **3E8/IRQ4**		Serial Port 2 I/O port address is 3E8 and the interrupt address is IRQ4
➔ **2E8/IRQ3**		Serial Port 2 I/O port address is 2E8 and the interrupt address is IRQ3

➔ **Serial Port2 Mode [Normal]**

Allows BIOS to select the mode for Serial Port 2.

➔ **Normal**	DEFAULT	Serial Port 2 mode is normal
➔ **IrDA**		Serial Port 2 mode is IrDA
➔ **ASK IR**		Serial Port 2 mode is ASK IR

➔ **Parallel Port Address [378]**

Use the **Parallel Port Address** option to select the parallel port base address.

- ➔ **Disabled** No base address is assigned to the Parallel Port
- ➔ **378** DEFAULT Parallel Port I/O port address is 378
- ➔ **278** Parallel Port I/O port address is 278
- ➔ **3BC** Parallel Port I/O port address is 3BC

➔ **Parallel Port Mode [Normal]**

Use the **Parallel Port Mode** option to select the mode the parallel port operates in.

- ➔ **Normal** DEFAULT The normal parallel port mode is the standard mode for parallel port operation.
- ➔ **Bi-directional** Parallel port outputs are 8-bits long. Inputs are accomplished by reading 4 of the 8 bits on the status register.
- ➔ **EPP** The parallel port operates in the enhanced parallel port mode (EPP). The EPP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode.

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➔ **ECP** The parallel port operates in the extended capabilities port (ECP) mode. The ECP mode supports bi-directional communication between the system and the parallel port device and the transmission rates between the two are much faster than the Normal mode

➔ **ECP+EPP** The parallel port operates in ECP and EPP modes.

➔ **Parallel Port IRQ [IRQ7]**

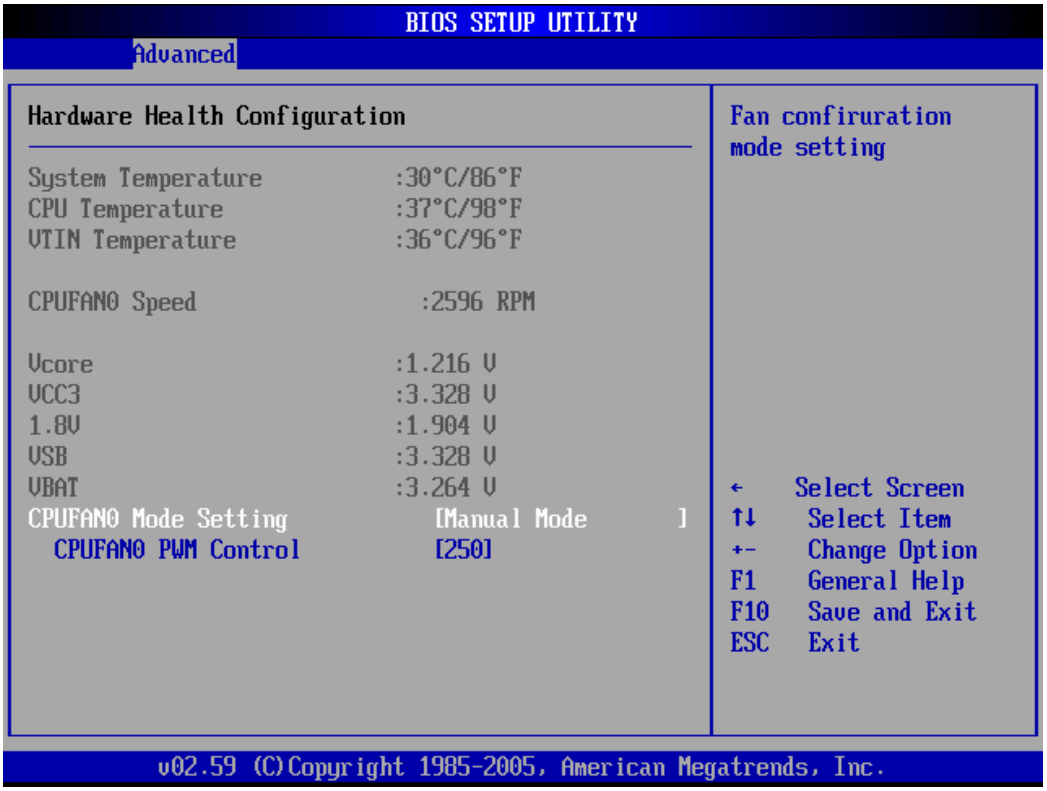
Use the **Parallel Port IRQ** selection to set the parallel port interrupt address.

➔ **IRQ5** IRQ5 is assigned as the parallel port interrupt address

➔ **IRQ7** DEFAULT IRQ7 is assigned as the parallel port interrupt address

5.3.5 Hardware Health Configuration

The **Hardware Health Configuration** menu (**BIOS Menu 8**) shows the operating temperature, fan speeds and system voltages.



BIOS Menu 8: Hardware Health Configuration

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➔ **CPU FAN Mode Setting: [Manual Mode]**

The CPU **FAN Mode Setting** has the following options:

➔ **Manual mode** DEFAULT When the **CPU FAN Mode Setting** is set to **Manual Mode**, the user is allowed to manually set the PWM duty cycle value. If selected, the following option will appear with values that can be configured:

- ➔ **CPUFAN0 PWM Control**

➔ **Thermal Cruise Mode** When the **CPU FAN Mode Setting** is set to **Thermal Cruise Mode**, the system attempts to keep the CPU temperature within a predefined temperature range. If the temperature goes out of range, the CPU fan is driven slower/faster to reach the predefined range again. If selected, the following options will appear with values that can be configured:

- ➔ **CPUFAN0 TargetTemp Value**
- ➔ **CPUFAN0 Tolerance Value**
- ➔ **CPUFAN0 StartUp Value**
- ➔ **CPUFAN0 Stop Value**
- ➔ **CPUFAN0 StopTime Value**

➔ **Speed Cruise Mode**

When the **CPU FAN Mode Setting** is set to **Speed Cruise Mode**, the CPU fan runs at a predefined speed. If selected, the following options will appear with values that can be configured:

- ➔ **CPUFAN0 TargetSpeed Value**
- ➔ **CPUFAN0 Tolerance Value**
- ➔ **CPUFAN0 StopTime Value**

The following system parameters and values are shown. The system parameters that are monitored are:

- **System Temperatures**: The following system temperatures are monitored
  - System Temperature
  - CPU Temperature
  - VTIN Temperature
- **Fan Speeds**: The CPU cooling fan speed is monitored.
  - CPUFAN0 Speed
- **Voltages**: The following system voltages are monitored
  - Vcore
  - VCC3
  - 1.8V
  - VSB
  - VBAT

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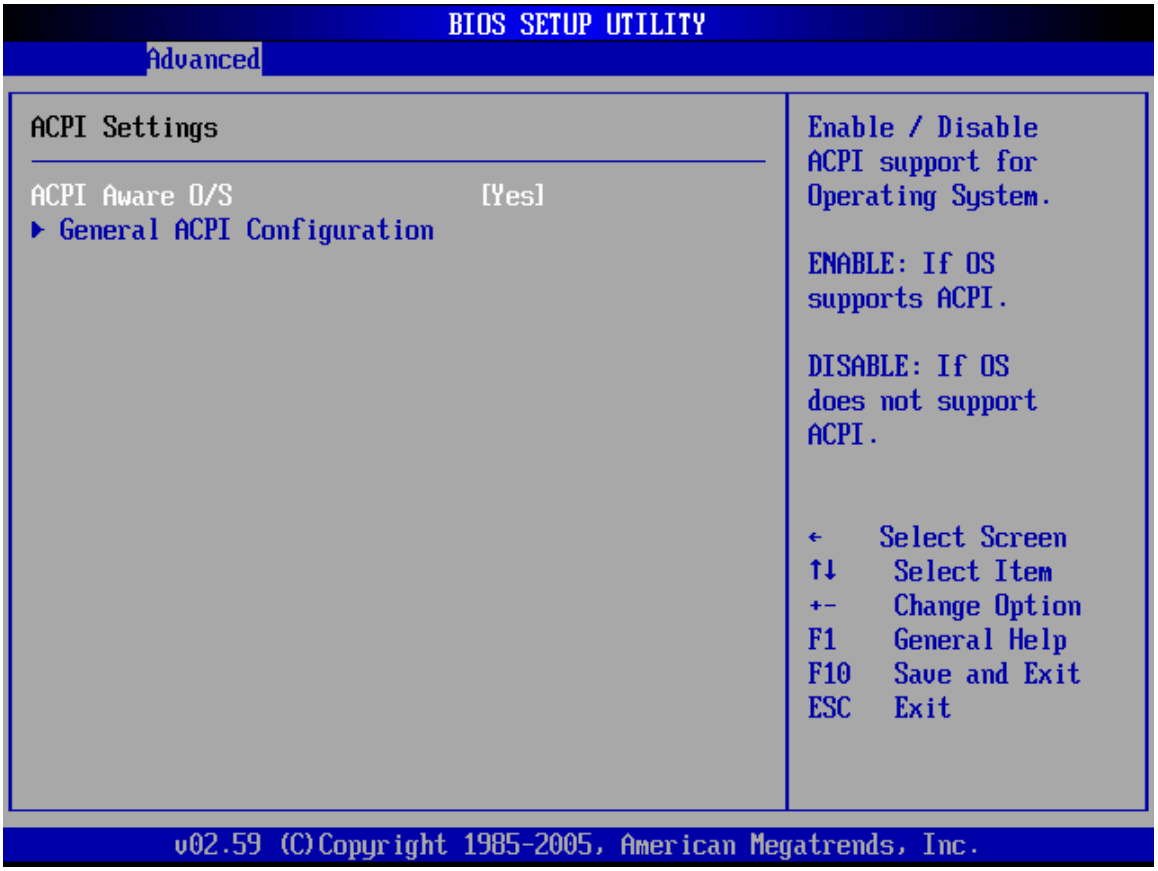
5.3.6 ACPI Configuration

The **ACPI Configuration** menu (**BIOS Menu 9**) configures the Advanced Configuration and Power Interface (ACPI) and Power Management (APM) options.



BIOS Menu 9: ACPI Configuration

➔ **ACPI Aware O/S [Yes]**

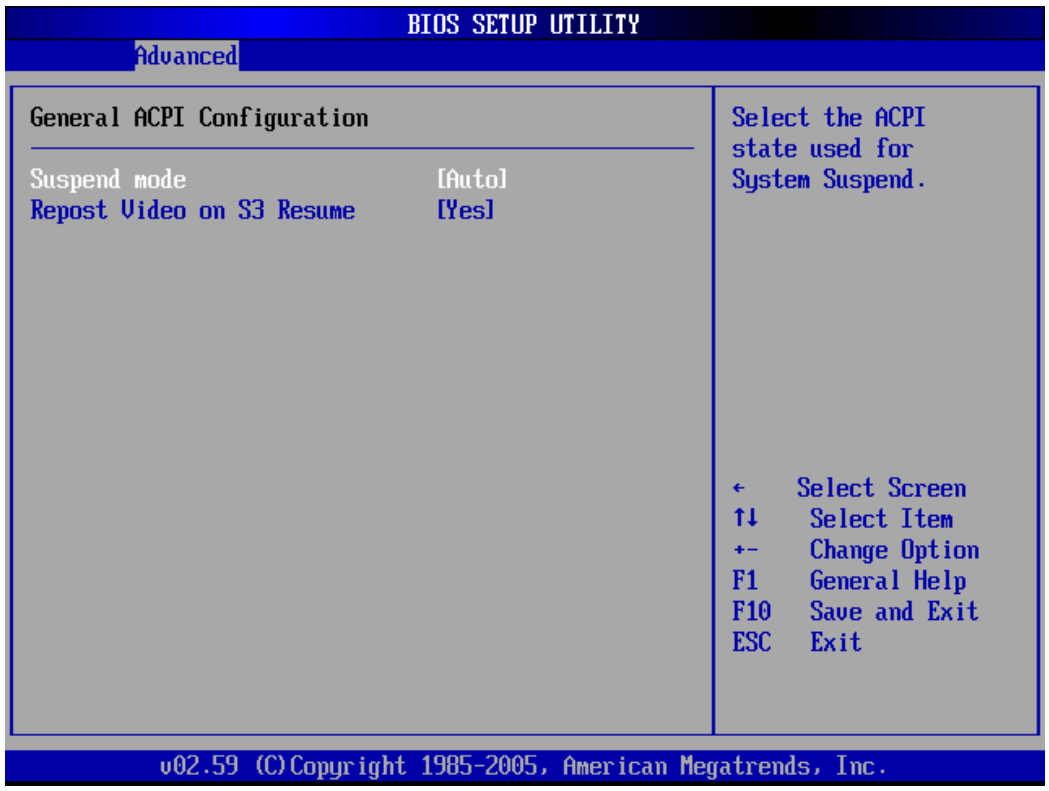
Use the **ACPI Aware O/S** option to enable the system to configure ACPI power saving options. ACPI can only be implemented if the system OS complies with the ACPI standard. Windows® 98, Windows® 2000, and Windows® XP all comply with ACPI.

➔ **No** Disables the ACPI support for the OS. This selection should be disabled if the OS does not support ACPI

➔ **Yes** DEFAULT Enables the ACPI support for the operating system. This selection should be enabled if the OS does support ACPI

5.3.6.1 General ACPI Configuration

Use the **General ACPI Configuration** menu (**BIOS Menu 10**) to select the ACPI state when the system is suspended.



BIOS Menu 10: General ACPI Configuration

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➔ **Suspend mode [Auto]**

Use the **Suspend Mode** option to specify the sleep state the system enters when it is not being used.

➔ **Auto**	DEFAULT	The OS selects the sleep state when then system is not being used.
➔ **S1 (POS)**		The system enters S1(POS) sleep state. The system appears off. The CPU is stopped; RAM is refreshed; the system is running in a low power mode.
➔ **S3 (STR)**		The system enters a S3(STR) sleep state. The CPU has no power; RAM is in slow refresh; the power supply is in a reduced power mode.

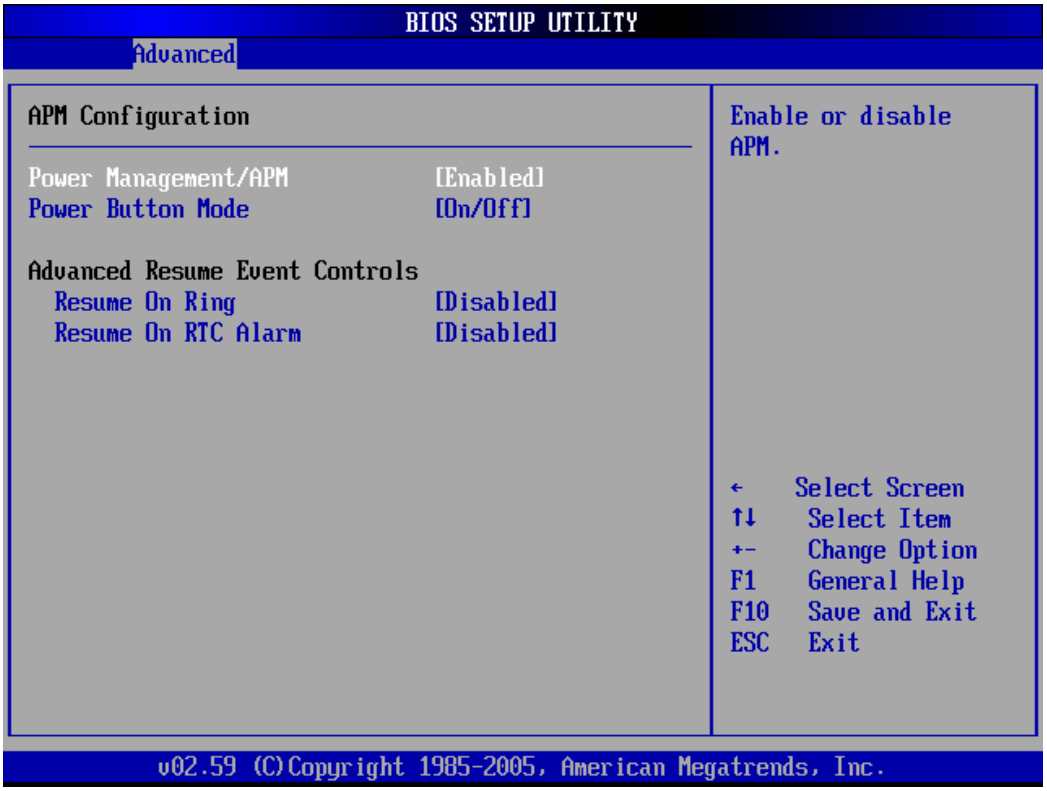
➔ **Repost Video on S3 Resume [Yes]**

Use the **Repost Video on S3 Resume** option to enable video repost support, allowing the video BIOS to be initialized when coming out of S3 state.

➔ **Yes**	DEFAULT	The video BIOS will be initialized when coming out of S3 state
➔ **No**		The video BIOS will be initialized when coming out of S3 state

5.3.7 APM Configuration

Use the **APM Configuration** menu (**BIOS Menu 11**) to select the advanced power management.



BIOS Menu 11: APM Configuration

➔ **Power Management/APM [Enabled]**

The **Power Management/APM** BIOS option accesses the advanced power management features.

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- ➔ **Disabled** Disables the Advanced Power Management (APM) feature
- ➔ **Enabled** DEFAULT Enables the APM feature

➔ **Power Button Mode [On/Off]**

The **Power Button Mode** BIOS specifies how the power button functions.

- ➔ **On/Off** DEFAULT When the power button is pressed the system is either turned on or off
- ➔ **Suspend** When the power button is pressed the system goes into suspend mode

➔ **Resume on Ring [Disabled]**

The **Resume on Ring** BIOS option specifies if the system will be roused from a suspended or standby state when there is activity on the RI (ring in) modem line. That is, the system will be roused by an incoming call on a modem.

- ➔ **Disabled** DEFAULT Wake event not generated by an incoming call
- ➔ **Enabled** Wake event generated by an incoming call

➔ **Resume On RTC Alarm [Disabled]**

The **Resume On RTC Alarm** determines when the computer will be roused from a suspended state.

➔ **Disabled** DEFAULT The real time clock (RTC) cannot generate a wake event

➔ **Enabled** If selected, the following will appear with values that can be selected:

- ➔ **RTC Alarm Date (Days)**
- ➔ **RTC Alarm Time**

After setting the alarm, the computer will turn itself on from a suspend state when the alarm goes off.

Insert the SIS Solution CD that came with the package

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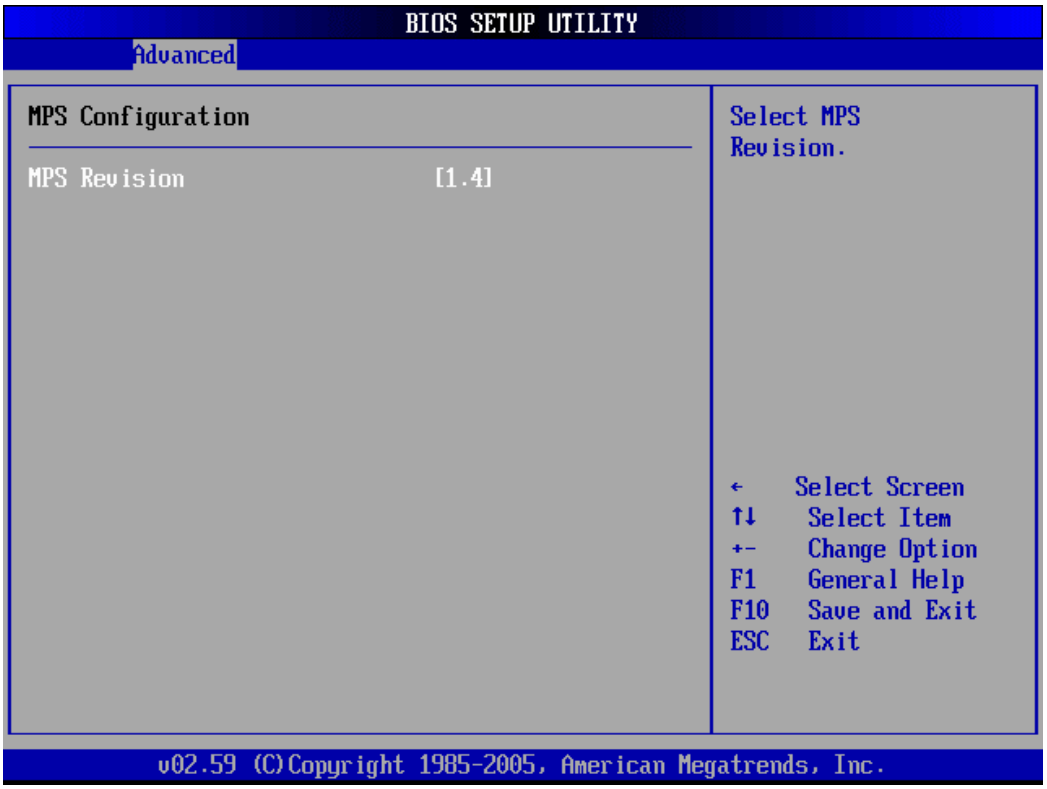
5.3.8 MPS Configuration

Use the **MPS Configuration** menu (**BIOS Menu 12**) to select the multi-processor table.



BIOS Menu 12: MPS Configuration

➔ **MPS Revision [1.4]**

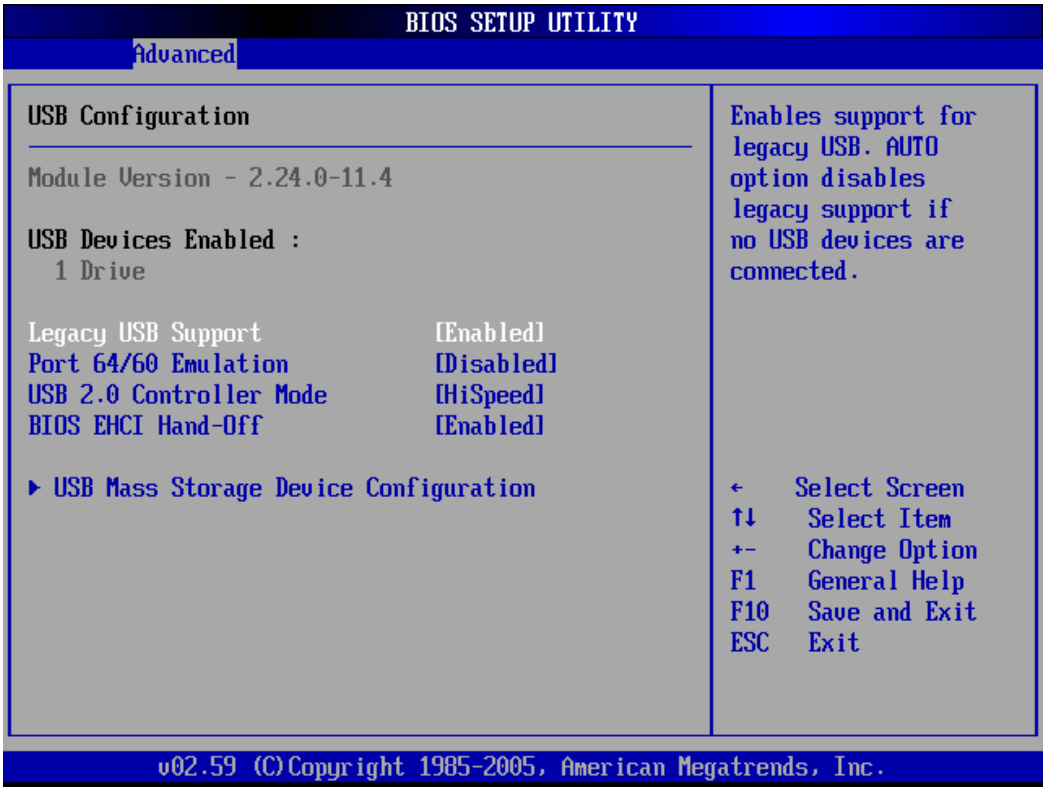
Use the **Multiprocessor Specification (MPS) Revision** option to specify the MPS version to be used.

➔ **1.1** MPS version 1.1 is used

➔ **1.4** DEFAULT MPS version 1.4 is used

5.3.9 USB Configuration

Use the **USB Configuration** menu (**BIOS Menu 13**) to read USB configuration information and configure the USB settings.


BIOS SETUP UTILITY
Advanced
USB Configuration
Module Version - 2.24.0-11.4
USB Devices Enabled :
1 Drive
Legacy USB Support [Enabled]
Port 64/60 Emulation [Disabled]
USB 2.0 Controller Mode [HiSpeed]
BIOS EHCI Hand-Off [Enabled]
▸ USB Mass Storage Device Configuration
Enables support for legacy USB. AUTO option disables legacy support if no USB devices are connected.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 13: USB Configuration

➔ **USB Configuration**

The **USB Configuration** field shows the system USB configuration. The items listed are:

- Module Version: x.xxxxx.xxxxx

➔ **USB Devices Enabled**

The **USB Devices Enabled** field lists the USB devices that are enabled on the system

➔ **Legacy USB Support [Enabled]**

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Use the **Legacy USB Support** BIOS option to enable USB mouse and USB keyboard support.

Normally if this option is not enabled, any attached USB mouse or USB keyboard does not become available until a USB compatible operating system is fully booted with all USB drivers loaded. When this option is enabled, any attached USB mouse or USB keyboard can control the system even when there is no USB driver loaded onto the system.

➔	**Disabled**		Legacy USB support disabled
➔	**Enabled**	DEFAULT	Legacy USB support enabled
➔	**Auto**		Legacy USB support disabled if no USB devices are connected

➔ **Port 64/60 Emulation [Disabled]**

Use the **Port 64/60 Emulation Mode** BIOS option to enable or disable the "Port 60h/64h" trapping option. Port 60h/64h trapping allows the BIOS to provide full PS/2 based legacy support for the USB keyboard and mouse. This option is useful for Microsoft® Windows® NT Operating System and for multi-language keyboards. Also this option provides the PS/2 functionalities like keyboard lock, password setting, scan code selection etc to USB keyboards.

➔	**Disabled**	DEFAULT	Port 60h/64h trapping option enabled
➔	**Enabled**		Port 60h/64h trapping option disabled

➔ **USB2.0 Controller Mode [HiSpeed]**

Use the **USB2.0 Controller Mode** option to set the speed of the USB2.0 controller.

➔	**FullSpeed**		The controller is capable of operating at 12Mb/s
➔	**HiSpeed**	DEFAULT	The controller is capable of operating at 480Mb/s

➔ **BIOS EHCI Handoff [Enabled]**

Use the **BIOS EHCI Handoff** option for systems running OSes that do not have EHCI hand-off support. The EHCI ownership change is managed by the EHCI driver.

➔ **Disabled**		Systems with OSes that do not support EHCI can use the EHCI handoff functionality.
➔ **Enabled**	DEFAULT	Systems with OSes that do not support EHCI cannot use the EHCI handoff functionality.

5.4 PCI/PnP

Use the **PCI/PnP** menu (**BIOS Menu 14**) to configure advanced PCI and PnP settings.

WARNING:

Setting wrong values for the BIOS selections in the PCIPnP BIOS menu may cause the system to malfunction.

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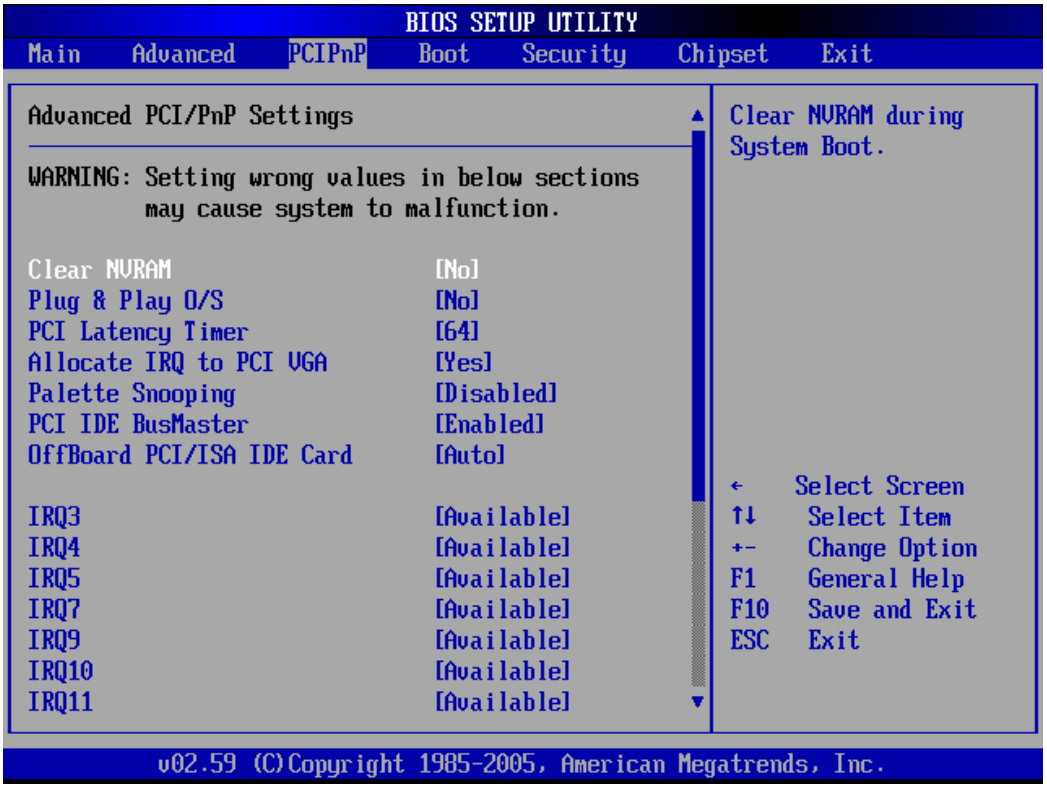
BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Advanced PCI/PnP Settings
WARNING: Setting wrong values in below sections
may cause system to malfunction.
Clear NVRAM [No]
Plug & Play O/S [No]
PCI Latency Timer [64]
Allocate IRQ to PCI VGA [Yes]
Palette Snooping [Disabled]
PCI IDE BusMaster [Enabled]
OffBoard PCI/ISA IDE Card [Auto]
IRQ3 [Available]
IRQ4 [Available]
IRQ5 [Available]
IRQ7 [Available]
IRQ9 [Available]
IRQ10 [Available]
IRQ11 [Available]
Clear NVRAM during System Boot.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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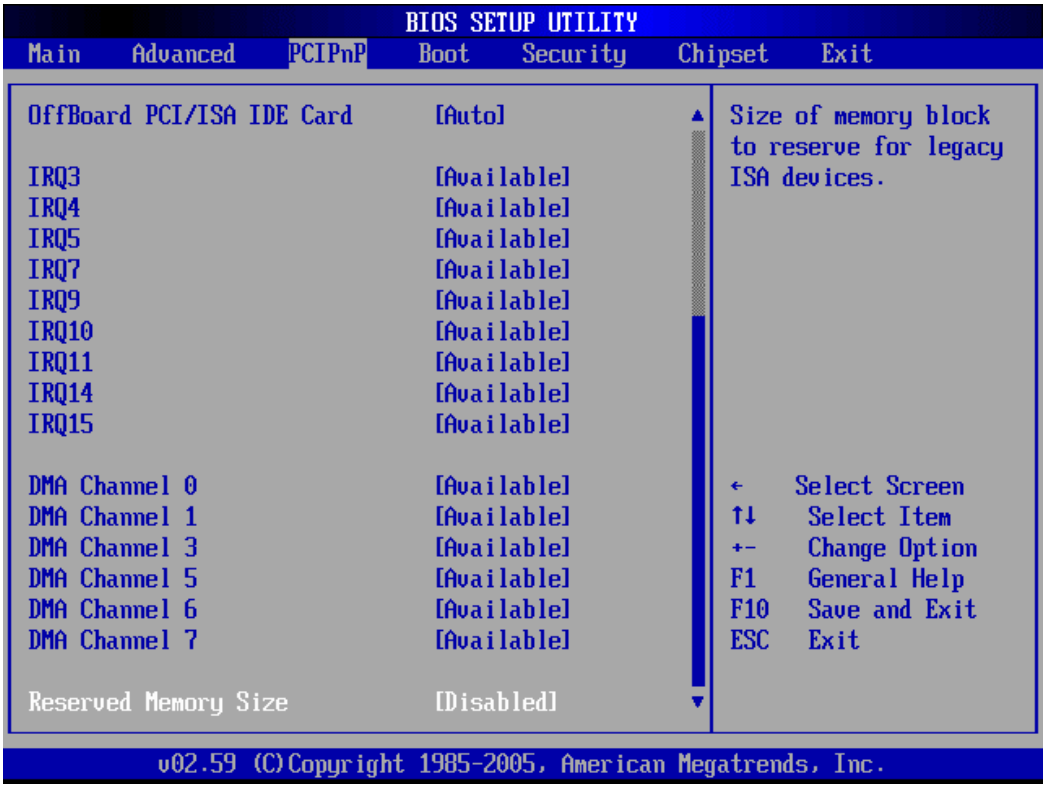

BIOS Menu 14: PCI/PnP Configuration

➔ **Clear NVRAM [No]**

Use the **Clear NVRAM** option to specify if the NVRAM (Non-Volatile RAM) is cleared when the power is turned off.

➔ **No** DEFAULT System does not clear NVRAM during system boot

➔ **Yes** System clears NVRAM during system boot

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➔ **Plug & Play O/S [No]**

Use the **Plug & Play O/S** BIOS option to specify whether system plug and play devices are configured by the operating system or the BIOS.

➔ **No** DEFAULT If the operating system does not meet the Plug and Play specifications, this option allows the BIOS to configure all the devices in the system.

➔ **Yes** This setting allows the operating system to change the interrupt, I/O, and DMA settings. Set this option if the system is running Plug and Play aware operating systems.

➔ **PCI Latency Timer [64]**

Use the **PCI Latency Timer** option to specify the PCI latency time. The latency time is measured in units of PCI clock cycles for the PCI device latency timer register. Configuration options are:

- 32
- 64 DEFAULT
- 96
- 128
- 160
- 192
- 224
- 248

➔ **Allocate IRQ to PCI VGA [Yes]**

Use the **Allocate IRQ to PCI VGA** option to restrict the system from giving the VGA adapter card an interrupt address.

➔ **Yes** DEFAULT Assigns an IRQ to a PCI VGA card if card requests IRQ

➔ **No** Does not assign IRQ to a PCI VGA card even if the card requests an IRQ

➔ **Palette Snooping [Disabled]**

Use the **Palette Snooping** option to enable or disable the palette snooping function.

➔ **Disabled** DEFAULT Unless the VGA card manufacturer requires palette snooping to be enabled, this option should be disabled.

➔ **Enabled** PCI devices are informed that an ISA based Graphics device is installed in the system so the ISA based Graphics card functions correctly. This does not necessarily indicate a physical ISA adapter card. The graphics chipset can be mounted on a PCI card. Always check with the adapter card manual first, before modifying the default settings in the BIOS.

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➔ **PCI IDE BusMaster [Enabled]**

Use the **PCI IDE BusMaster** BIOS option to enable or prevent PCI IDE busmastering.

➔ **Disabled**		Busmastering is prevented
➔ **Enabled**	DEFAULT	IDE controller on the PCI local bus has mastering capabilities

➔ **OffBoard PCI/ISA IDE Card [Auto]**

Use the **OffBoard PCI/ISA IDE Card** BIOS option to select the **OffBoard PCI/ISA IDE Card**.

➔ **Auto**	DEFAULT	The location of the Off Board PCI IDE adapter card is automatically detected by the AMIBIOS.
➔ **PCI Slot 1**		PCI Slot 1 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 1.
➔ **PCI Slot 2**		PCI Slot 2 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 2.
➔ **PCI Slot 3**		PCI Slot 3 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 3.
➔ **PCI Slot 4**		PCI Slot 4 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 4.

➔ **PCI Slot 5** PCI Slot 5 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 5.

➔ **PCI Slot 6** PCI Slot 6 is selected as the location of the OffBoard PCI IDE adapter card. Only select this slot if the adapter card is installed in PCI Slot 6.

➔ **IRQ# [Available]**

Use the **IRQ#** address to specify what IRQs can be assigned to a particular peripheral device.

➔ **Available** DEFAULT The specified IRQ is available to be used by PCI/PnP devices

➔ **Reserved** The specified IRQ is reserved for use by Legacy ISA devices

Available IRQ addresses are:

- IRQ3
- IRQ4
- IRQ5
- IRQ7
- IRQ9
- IRQ10
- IRQ 11
- IRQ 14
- IRQ 15

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➔ **DMA Channel# [Available]**

Use the **DMA Channel#** option to assign a specific DMA channel to a particular PCI/PnP device.

➔ **Available** DEFAULT The specified DMA is available to be used by PCI/PnP devices

➔ **Reserved** The specified DMA is reserved for use by Legacy ISA devices

Available DMA Channels are:

- DM Channel 0
- DM Channel 1
- DM Channel 3
- DM Channel 5
- DM Channel 6
- DM Channel 7

➔ **Reserved Memory Size [Disabled]**

Use the **Reserved Memory Size** BIOS option to specify the amount of memory that should be reserved for legacy ISA devices.

➔ **Disabled** DEFAULT No memory block reserved for legacy ISA devices

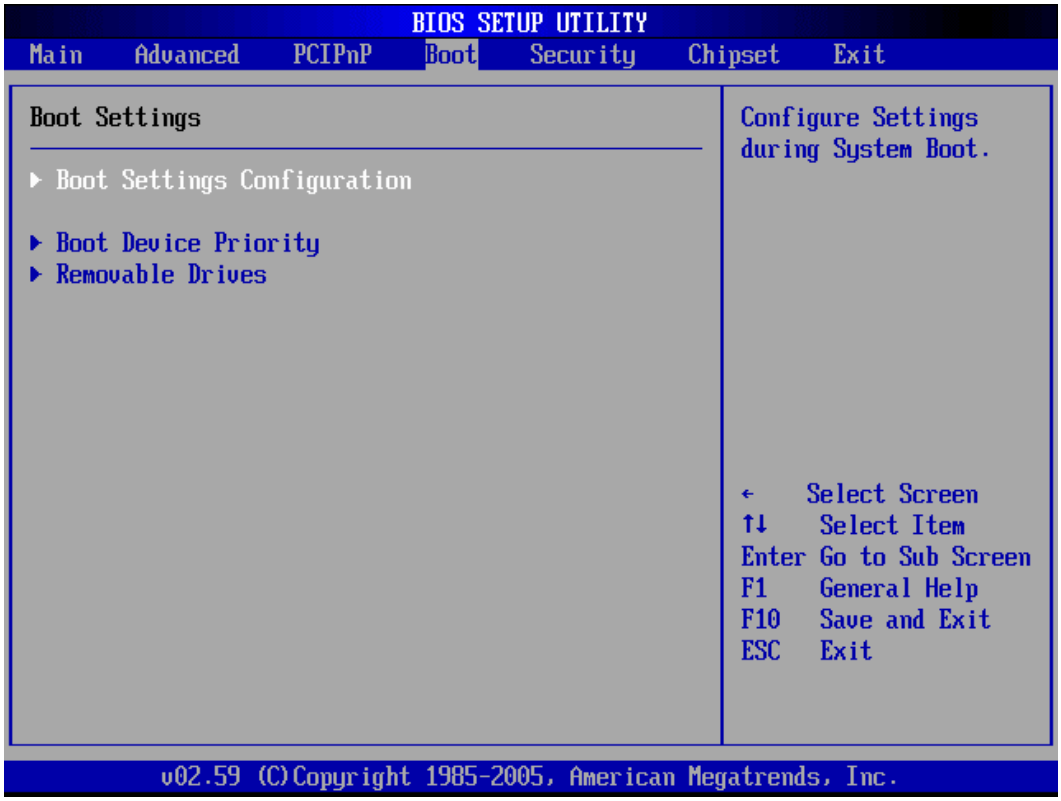
➔ **16K** 16KB reserved for legacy ISA devices

➔ **32K** 32KB reserved for legacy ISA devices

➔ **64K** 54KB reserved for legacy ISA devices

5.5 Boot

Use the **Boot** menu (**BIOS Menu 15**) to configure system boot options.



BIOS Menu 15: Boot

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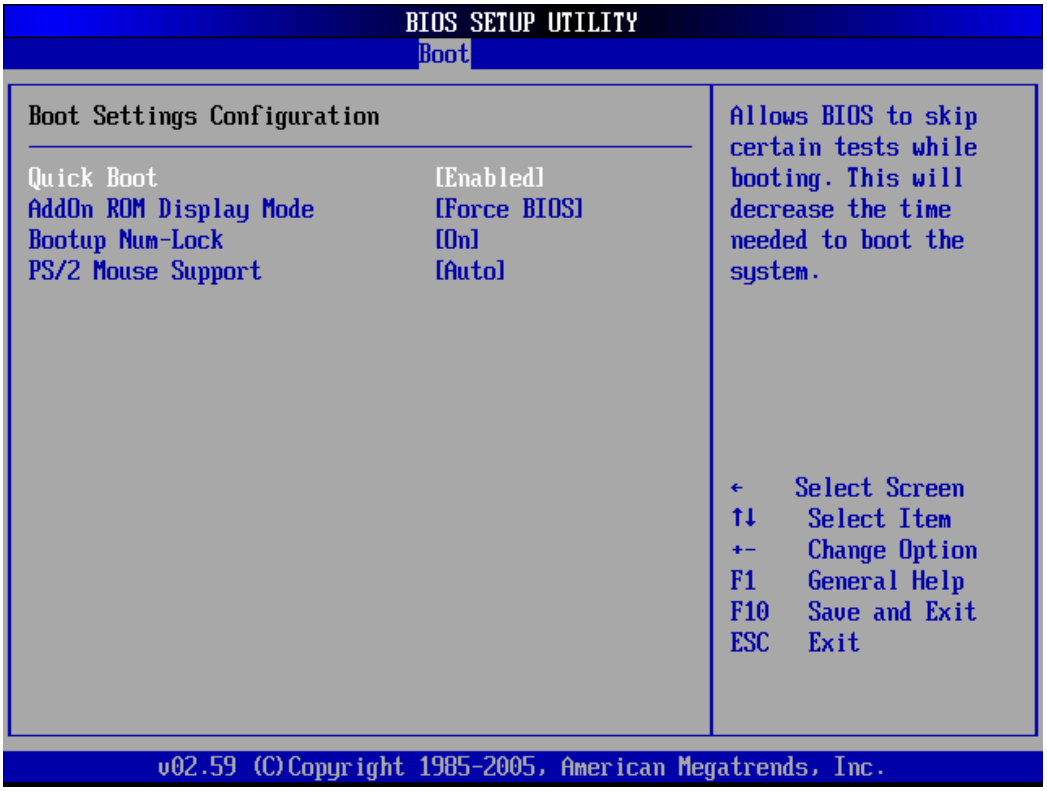
5.5.1 Boot Settings Configuration

Use the **Boot Settings Configuration** menu (**BIOS Menu 16**) to configure advanced system boot options.


BIOS SETUP UTILITY
Boot
Boot Settings Configuration
Quick Boot [Enabled]
AddOn ROM Display Mode [Force BIOS]
Bootup Num-Lock [On]
PS/2 Mouse Support [Auto]
Allows BIOS to skip certain tests while booting. This will decrease the time needed to boot the system.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 16: Boot Settings Configuration

➔ **Quick Boot [Enabled]**

Use the **Quick Boot** BIOS option to make the computer speed up the boot process.

➔ **Disabled**		No POST procedures are skipped
➔ **Enabled**	DEFAULT	Some POST procedures are skipped to decrease the system boot time

➔ **AddOn ROM Display Mode [Force BIOS]**

Use the **AddOn ROM Display Mode** option to allow add-on ROM (read-only memory) messages to be displayed.

- ➔ **Force BIOS** DEFAULT The system forces third party BIOS to display during system boot.
- ➔ **Keep Current** The system displays normal information during system boot.

➔ **Bootup Num-Lock [On]**

Use the **Bootup Num-Lock** BIOS option to specify if the number lock setting must be modified during boot up.

- ➔ **Off** Does not enable the keyboard Number Lock automatically. To use the 10-keys on the keyboard, press the Number Lock key located on the upper left-hand corner of the 10-key pad. The Number Lock LED on the keyboard lights up when the Number Lock is engaged.

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➔ **On** DEFAULT Allows the Number Lock on the keyboard to be enabled automatically when the computer system boots up. This allows the immediate use of the 10-key numeric keypad located on the right side of the keyboard. To confirm this, the Number Lock LED light on the keyboard is lit.

➔ **PS/2 Mouse Support [Auto]**

Use the **PS/2 Mouse Support** option adjusts PS/2 mouse support capabilities.

➔ **Disabled** PS/2 mouse support is disabled and prevented from using system resources.

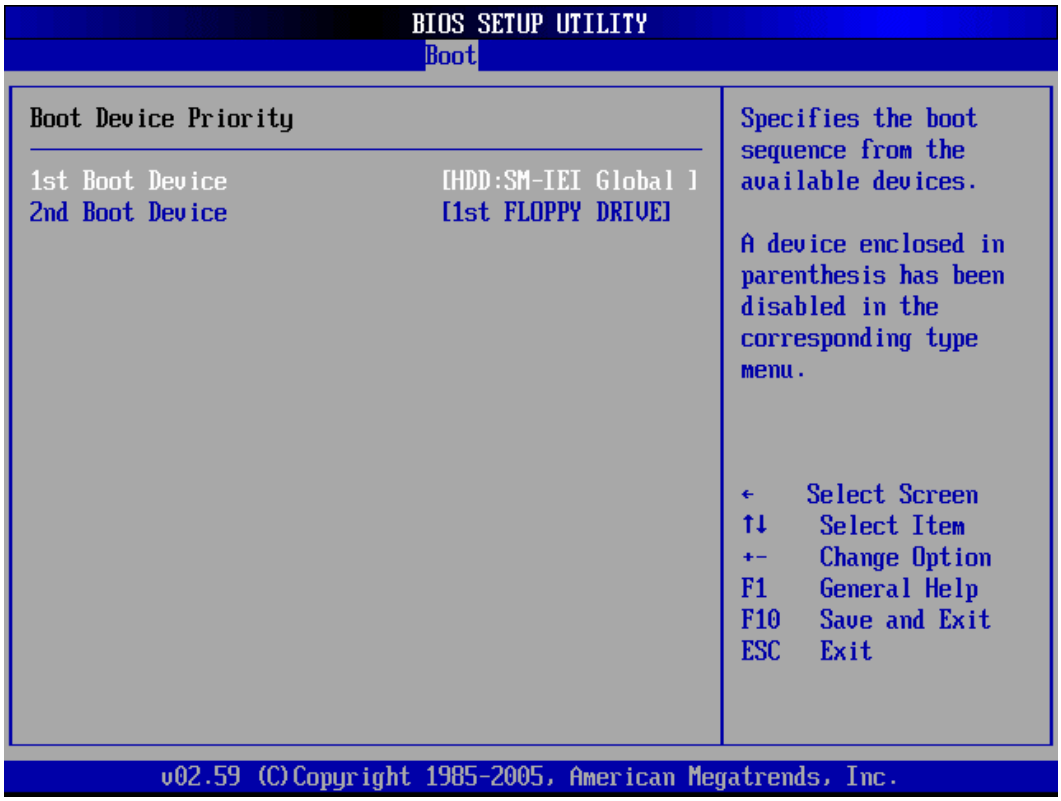
➔ **Enabled** Allows the system to use a PS/2 mouse.

➔ **Auto** DEFAULT The system auto-adjusts PS/2 mouse support.

5.5.2 Boot Device Priority

Use the **Boot Device Priority** menu (**BIOS Menu 17**) to specify the boot sequence from the available devices. Possible boot devices may include:

- 1st FLOPPY DRIVE
- HDD
- CD/DVD


BIOS SETUP UTILITY
Boot
Boot Device Priority
1st Boot Device [HDD:SM-IEI Global]
2nd Boot Device [1st FLOPPY DRIVE]
Specifies the boot sequence from the available devices.
A device enclosed in parenthesis has been disabled in the corresponding type menu.
← Select Screen
↑↓ Select Item
+- Change Option
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 17: Boot Device Priority Settings

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5.5.3 Removable Drives

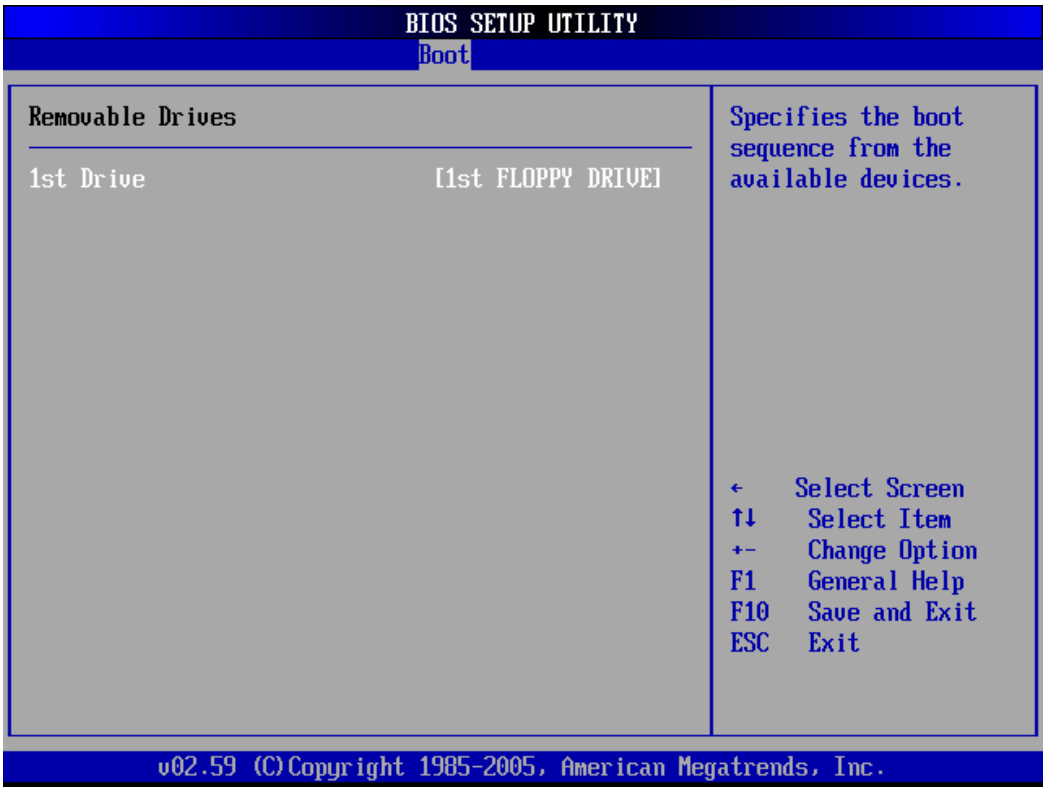
Use the **Removable Drives** menu (**BIOS Menu 18**) to specify the boot sequence of the available FDDs. When the menu is opened, the FDDs connected to the system are listed as shown below:

- 1st Drive

NOTE:

Only the drives connected to the system are shown. For example, if only one FDD is connected only "**1st Drive**" is listed.

The boot sequence from the available devices is selected. If the "**1st Drive**" option is selected a list of available removable drives is shown. Select the first drive the system boots from. If the "**1st Drive**" is not used for booting this option may be disabled.



BIOS Menu 18: Removable Drives

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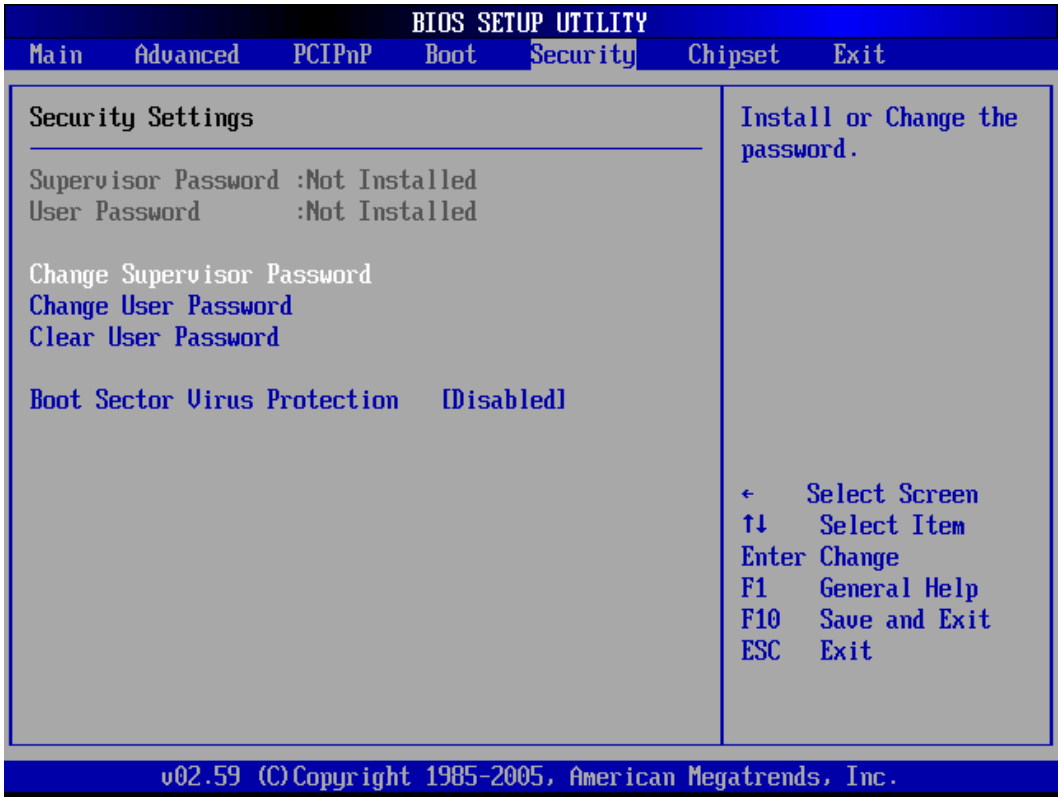
5.6 Security

Use the **Security** menu (**BIOS Menu 19**) to set system and user passwords.



BIOS Menu 19: Security

➔ Change Supervisor Password

Use the **Change Supervisor Password** to set or change a supervisor password. The default for this option is **Not Installed**. If a supervisor password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change Supervisor Password**.

➔ **Change User Password**

Use the **Change User Password** to set or change a user password. The default for this option is **Not Installed**. If a user password must be installed, select this field and enter the password. After the password has been added, **Install** appears next to **Change User Password**.

➔ **Boot Sector Virus Protection [Disabled]**

Use the **Boot Sector Virus Protection** to enable or disable boot sector protection.

➔	**Disabled**	DEFAULT	Disables the boot sector virus protection
➔	**Enabled**		Enables the boot sector virus protection

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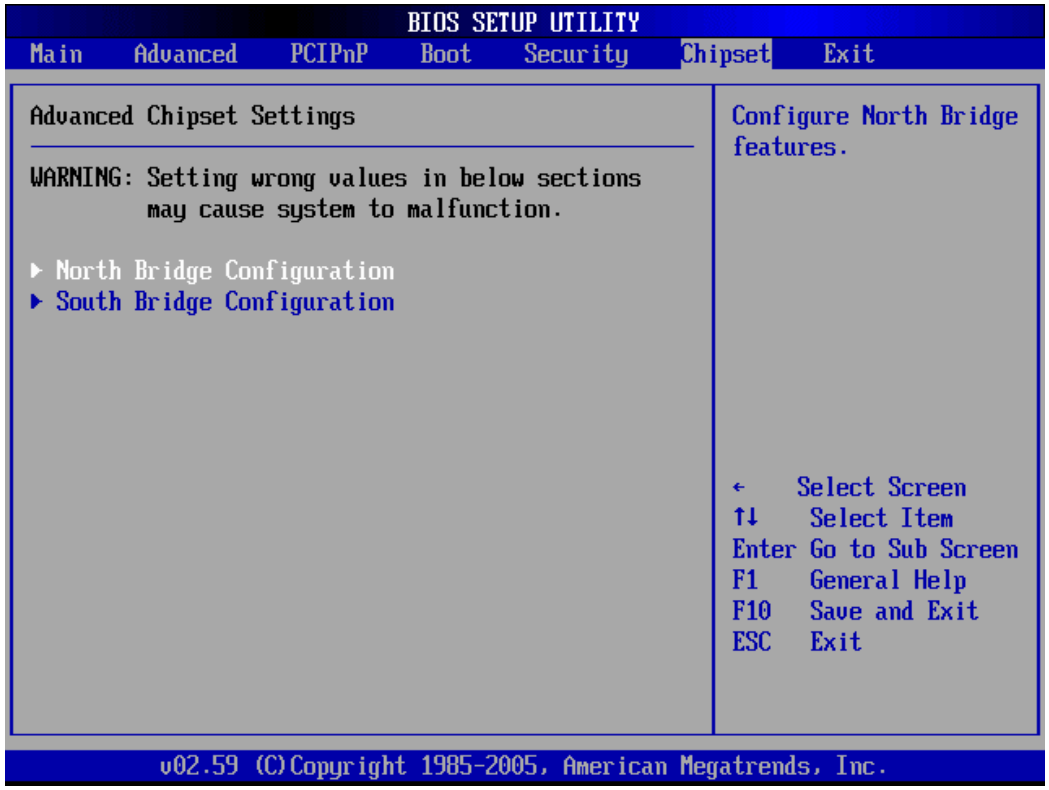
5.7 Chipset

Use the **Chipset** menu (**BIOS Menu 20**) to access the Northbridge and Southbridge configuration menus.

WARNING:

Setting the wrong values for the Chipset BIOS selections in the Chipset BIOS menu may cause the system to malfunction.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Advanced Chipset Settings
WARNING: Setting wrong values in below sections may cause system to malfunction.
North Bridge Configuration
South Bridge Configuration
Configure North Bridge features.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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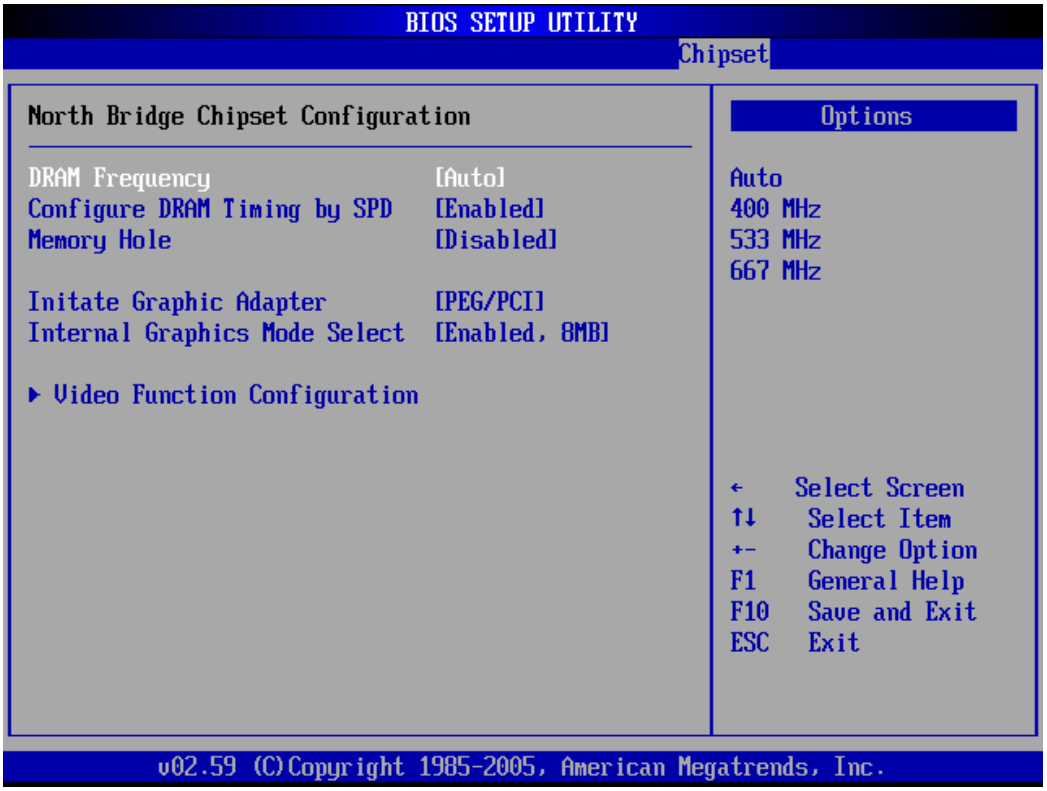
BIOS Menu 20: Chipset

5.7.1 Northbridge Configuration

Use the **Northbridge Configuration** menu (**BIOS Menu 21**) to configure the Northbridge chipset.



BIOS Menu 21: Northbridge Chipset Configuration

➔ **DRAM Frequency [Auto]**

Use the **DRAM Frequency** option to specify the DRAM frequency or allow the system to automatically detect the DRAM frequency.

➔	**Auto**	DEFAULT	Automatically selects the DRAM frequency
➔	**400MHz**		Sets the DRAM frequency to 400MHz

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➔ **533MHz** Sets the DRAM frequency to 533MHz

➔ **667MHz** Sets the DRAM frequency to 667MHz

➔ **Configure DRAM Timing by SPD [Enabled]**

Use the **Configure DRAM Timing by SPD** option to determine if the system uses the SPD *(*Serial Presence Detect) EEPROM to configure the DRAM timing. The SPD EEPROM contains all necessary DIMM specifications including the speed of the individual components such as CAS and bank cycle time as well as valid settings for the module and the manufacturer's code. The SPD enables the BIOS to read the spec sheet of the DIMMs on boot-up and then adjust the memory timing parameters accordingly.

➔ **Disabled** DRAM timing parameters are manually set using the DRAM sub-items

➔ **Enabled** DEFAULT DRAM timing parameter are set according to the DRAM Serial Presence Detect (SPD)

If the **Configure DRAM Timing by SPD** option is disabled, the following configuration options appear.

- DRAM CAS# Latency [5]
- DRAM RAS# to CAS# Delay [6 DRAM Clocks]
- DRAM RAS# Precharge [6 DRAM Clocks]
- DRAM RAS# Activate to Precha [15 DRAM Clocks]

➔ **Memory Hole [Disabled]**

Use the **Memory Hole** option to reserve memory space between 15MB and 16MB for ISA expansion cards that require a specified area of memory to work properly. If an older ISA expansion card is used, please refer to the documentation that came with the card to see if it is necessary to reserve the space.

➔ **Disabled** DEFAULT Memory is not reserved for ISA expansion cards

➔ **15MB – 16MB** Between 15MB and 16MB of memory is reserved for ISA expansion cards

➔ **Initiate Graphic Adapter [PEG/PCI]**

Use the **Initiate Graphic Adapter** option to select the graphics controller used as the primary boot device. Select either an integrated graphics controller (IGD) or a combination of PCI graphics controller, a PCI Express (PEG) controller or an IGD. Configuration options are listed below:

- IGD DEFAULT
- PCI/IGD
- PCI/PEG
- PEG/IGD
- PEG/PCI

➔ **Internal Graphics Mode Select [Enabled, 8MB]**

Use the **Internal Graphic Mode Select** option to specify the amount of system memory that can be used by the Internal graphics device.

➔ **Disable**

➔ **Enabled, 1MB** 1MB of memory used by internal graphics device

➔ **Enabled, 8MB** DEFAULT 8MB of memory used by internal graphics device

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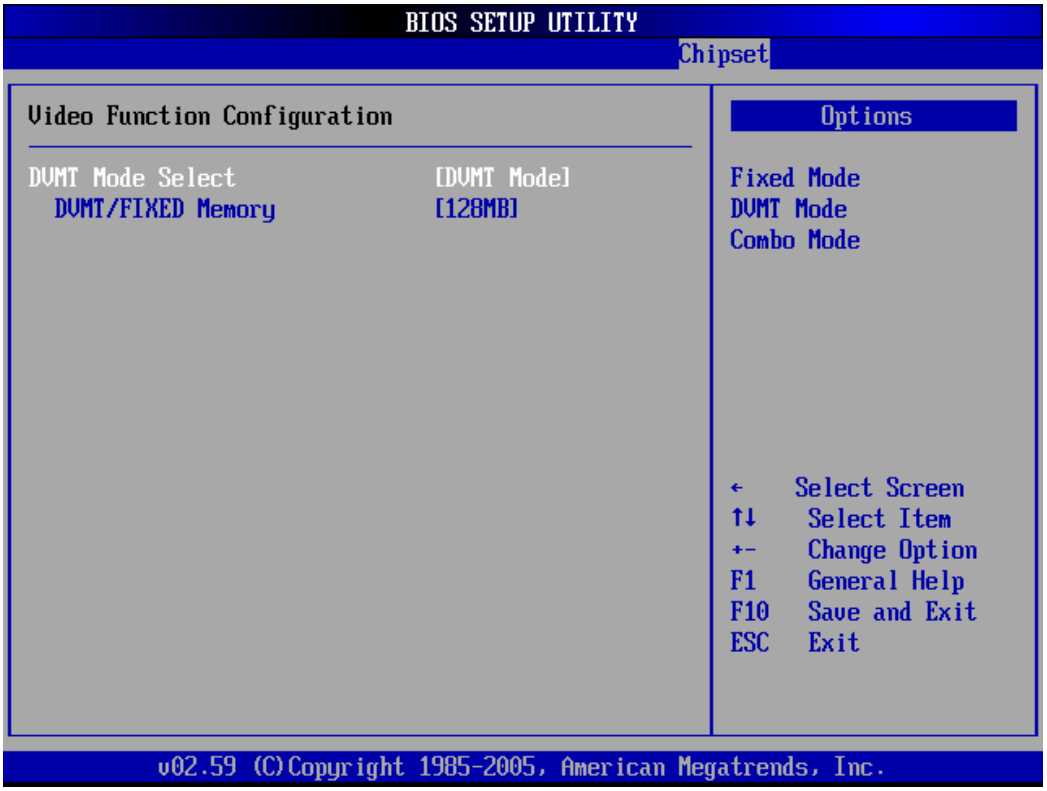
5.7.1.1 Video Function Configuration

Use the **Video Function Configuration** menu (**BIOS Menu 22**) to configure the video device connected to the system.



BIOS Menu 22: Video Function Configuration

➔ **DVMT Mode Select [DVMT Mode]**

Use the **DVMT Mode Select** option to select the Intel Dynamic Video Memory Technology (DVMT) operating mode.

➔ **Fixed Mode** A fixed portion of graphics memory is reserved as graphics memory.

➔ **DVMT Mode** DEFAULT Graphics memory is dynamically allocated according to the system and graphics needs.

➔ **Combo Mode** A fixed portion of graphics memory is reserved as graphics memory. If more memory is needed, graphics memory is dynamically allocated according to the system and graphics needs.

➔ **DVMT/FIXED Memory [128MB]**

Use the **DVMT/FIXED Memory** option to specify the maximum amount of memory that can be allocated as graphics memory. This option can only be configured for if **DVMT Mode** or **Fixed Mode** is selected in the **DVMT Mode Selec**t option. If **Combo Mode** is selected, the maximum amount of graphics memory is 128MB. Configuration options are listed below.

- 64MB
- 128MB DEFAULT
- Maximum DVMT

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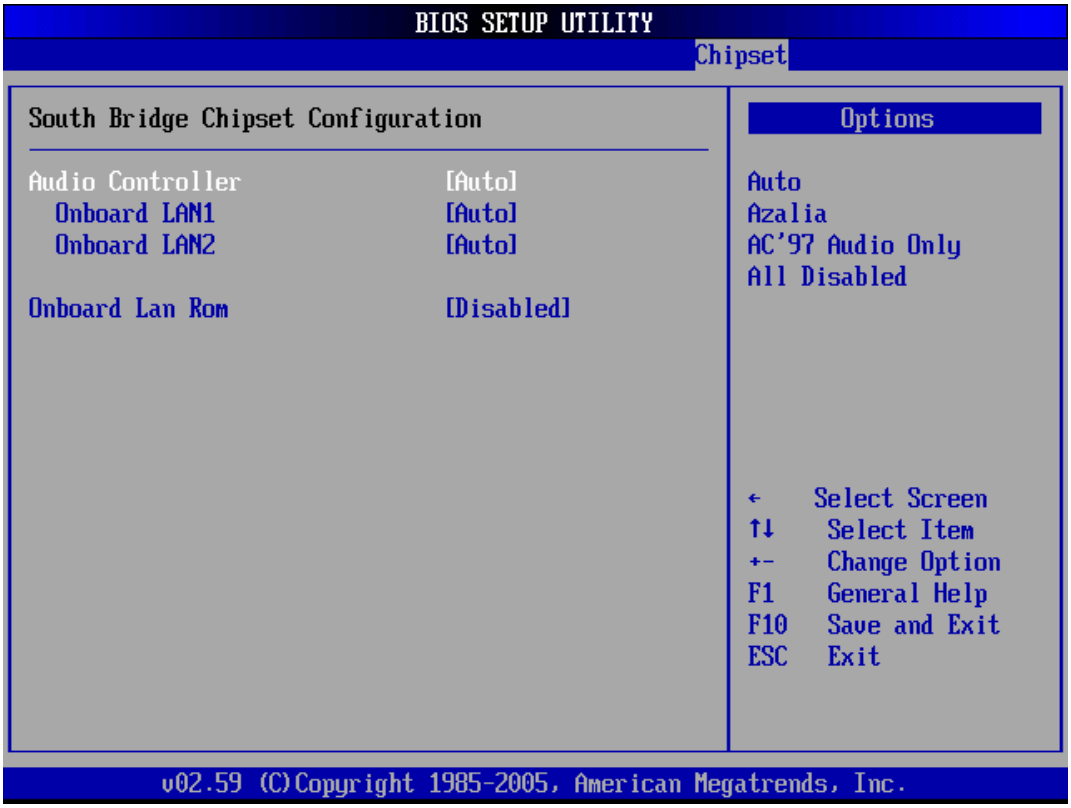
5.7.2 Southbridge Configuration

Use the **Southbridge Configuration** menu (**BIOS Menu 23**) to configure the Southbridge chipset.



BIOS Menu 23:Southbridge Chipset Configuration

➔ **Audio Controller [Auto]**

The **Audio Controller** option allows selection of the audio controller to use.

➔ **Auto**	DEFAULT	The onboard AC'97 controller is automatically detected and enabled
➔ **Azalia**		The Intel® High Definition Audio controller is manually enabled
➔ **AC`97 Audio Only**		The on-board AC'97 controller is manually enabled
➔ **All Disabled**		All audio controllers are disabled

➔ **Onboard LAN1 [Auto]**

The **Onboard LAN1** option enables or disables the on-board LAN1.

➔ **Auto**	DEFAULT	The on-board LAN1 controller is automatically detected and enabled
➔ **Enabled**		The on-board LAN1 controller is manually enabled
➔ **Disabled**		The on-board LAN1 controller is manually disabled

➔ **Onboard LAN2 [Auto]**

The **Onboard LAN2** option enables or disables the on-board LAN2.

➔ **Auto**	DEFAULT	The on-board LAN2 controller is automatically detected and enabled
➔ **Enabled**		The on-board LAN2 controller is manually enabled
➔ **Disabled**		The on-board LAN2 controller is manually disabled

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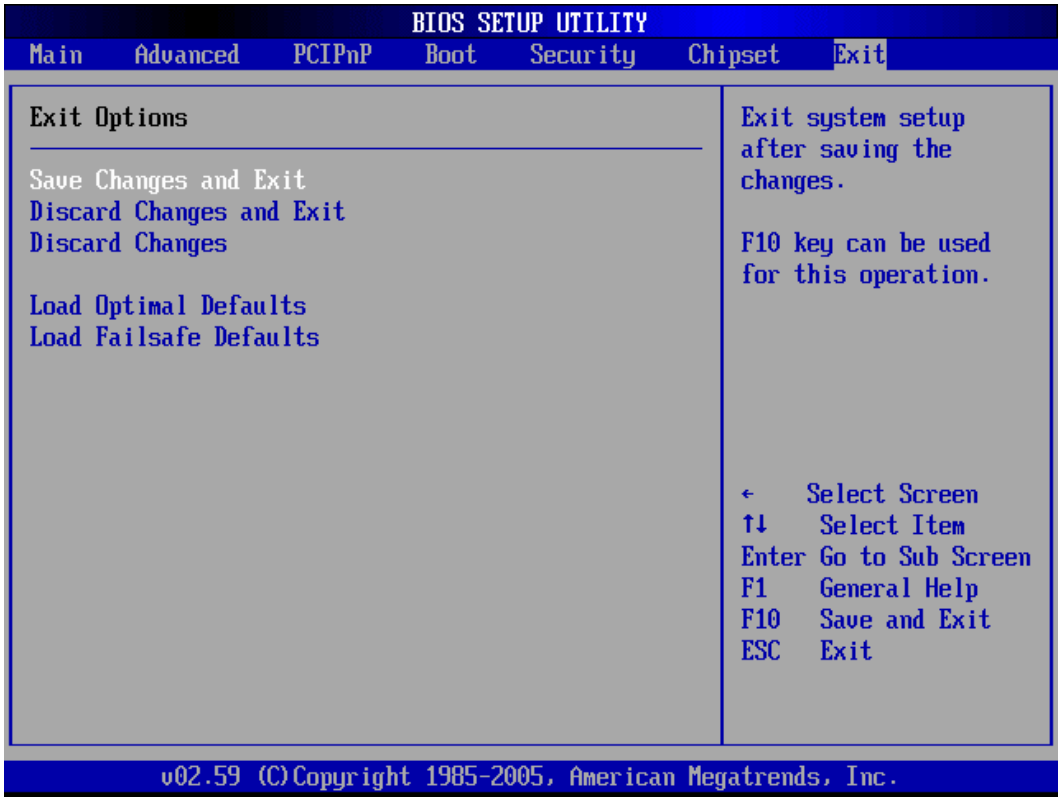
➔ **Onboard Lan Rom [Disabled]**

The **Onboard Lan Rom** option enables or disables the onboard LAN ROM.

➔ **Enabled**		The onboard LAN device automatically detected and enabled
➔ **Disabled**	DEFAULT	Onboard LAN device manually disabled

5.8 Exit

Use the **Exit** menu (**BIOS Menu 24**) to load default BIOS values, optimal failsafe values and to save configuration changes.


BIOS SETUP UTILITY
Main Advanced PCIPnP Boot Security Chipset Exit
Exit Options
Save Changes and Exit
Discard Changes and Exit
Discard Changes
Load Optimal Defaults
Load Failsafe Defaults
Exit system setup after saving the changes.
F10 key can be used for this operation.
← Select Screen
↑↓ Select Item
Enter Go to Sub Screen
F1 General Help
F10 Save and Exit
ESC Exit
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BIOS Menu 24:Exit

➔ Save Changes and Exit

Use the **Save Changes and Exit** option to save the changes made to the BIOS options and to exit the BIOS configuration setup program.

➔ Discard Changes and Exit

Use the **Discard Changes and Exit** option to exit the BIOS configuration setup program without saving the changes made to the system.

➔ Discard Changes

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Use the **Discard Changes** option to discard the changes and remain in the BIOS configuration setup program.

➔ **Load Optimal Defaults**

Use the **Load Optimal Defaults** option to load the optimal default values for each of the parameters on the Setup menus. **F9 key can be used for this operation.**

➔ **Load Failsafe Defaults**

Use the **Load Failsafe Defaults** option to load failsafe default values for each of the parameters on the Setup menus. **F8 key can be used for this operation.**

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Chapter

6

Software drivers

6.1 Available Software Drivers

NOTE:

The content of the CD may vary throughout the life cycle of the product and is subject to change without prior notice. Visit www.cyberresearch.com or contact technical support for the latest updates.

The CPGx Series motherboard has the following software drivers:

- Intel® Chipset Driver Installation
- VGA Utilities Driver
- LAN Driver (for GbE LAN) Installation
- Audio Driver (ALC655) Installation
- SATA Driver Installation

All drivers can be found on the CD that came with the CPU card. To install the drivers please follow the instructions in the sections below.

6.2 Chipset Driver Installation

To install the chipset driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the drivers and utilities for the CPGx Series board. Click Install Drivers/CPGT Drivers, then click on the Chipset's operating system to begin.

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Step 2: The "InstallShield Wizard Preparation Screen" in **Figure 6-1** appears.

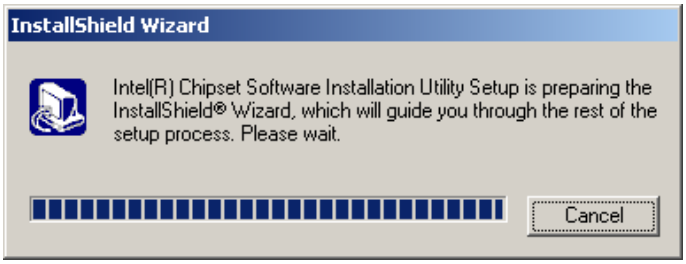
InstallShield Wizard
Intel(R) Chipset Software Installation Utility Setup is preparing the InstallShield® Wizard, which will guide you through the rest of the setup process. Please wait.
Cancel

Figure 6-1: InstallShield Wizard Preparation Screen

Step 3: The "Welcome" window in **Figure 6-2** appears next.

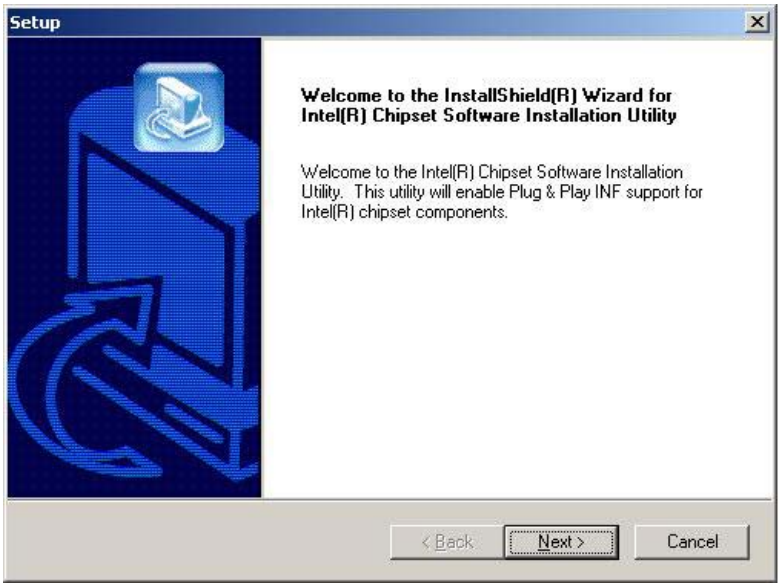
Setup
Welcome to the InstallShield(R) Wizard for Intel(R) Chipset Software Installation Utility
Welcome to the Intel(R) Chipset Software Installation Utility. This utility will enable Plug & Play INF support for Intel(R) chipset components.
< Back
Next >
Cancel

Figure 6-2: Welcome Screen

Step 4: Click "**NEXT**" and the license agreement shown in **Figure 6-3** appears.

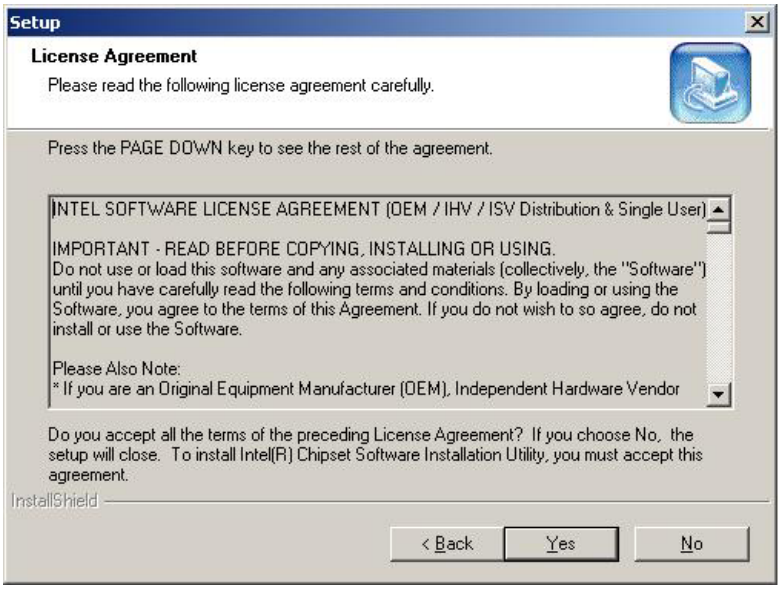
Setup
License Agreement
Please read the following license agreement carefully.
Press the PAGE DOWN key to see the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor
Do you accept all the terms of the preceding License Agreement? If you choose No, the setup will close. To install Intel(R) Chipset Software Installation Utility, you must accept this agreement.
InstallShield
< Back
Yes
No

Figure 6-3: License Agreement

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Step 5: Agree to the license terms by clicking "**YES**". The "**Readme**" in **Figure 6-4** appears.

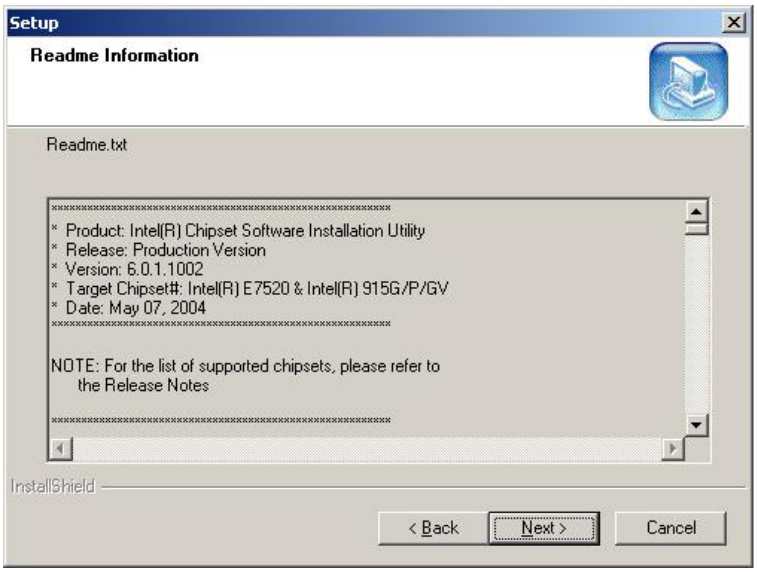

Figure 6-4: Readme Information

Step 6: Click "**YES**". The driver is installed on the computer. After the installation is complete, the installation complete screen shown in **Figure 6-5** appears. Select the preferred option and click "**FINISH**" to complete the installation process.

Setup
InstallShield(R) Wizard Complete
The InstallShield(R) Wizard has successfully installed Intel(R) Chipset Software Installation Utility. Before you can use the program, you must restart your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
< Back
Finish
Cancel

Figure 6-5: Restart the Computer

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6.3 VGA Driver

To install the VGA driver, please follow the steps below:

Step 1: Insert the CD into the system that contains the drivers and utilities for the CPGx Series board. Click Install Drivers/CPGT Drivers, then click on the your operating system, under the VGA section.

Step 2: The Starting Install Shield Wizard appears (**Figure 6-6**).

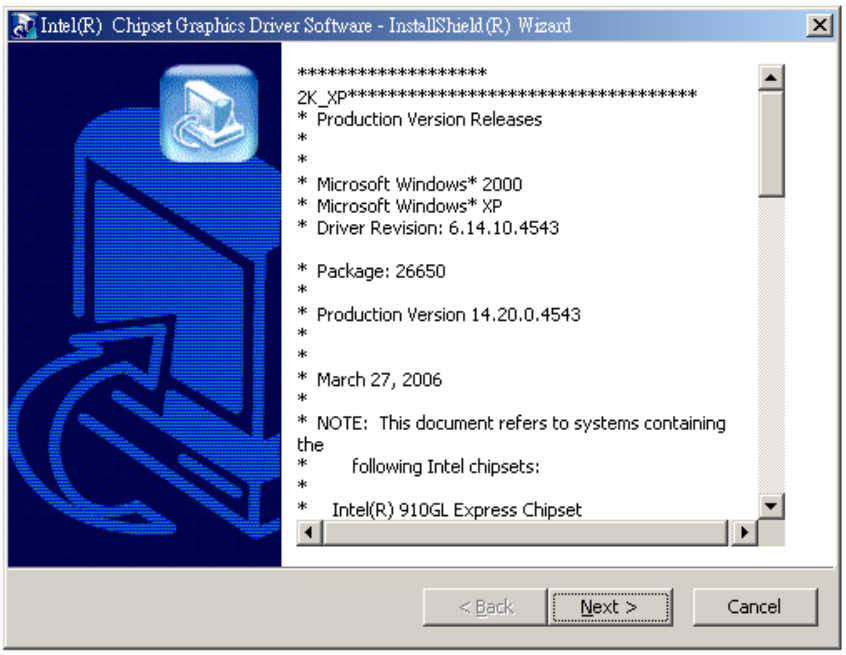

Figure 6-6: Starting Install Shield Wizard Screen

Step 3: The Preparing Setup window appears next (**Figure 6-7**).

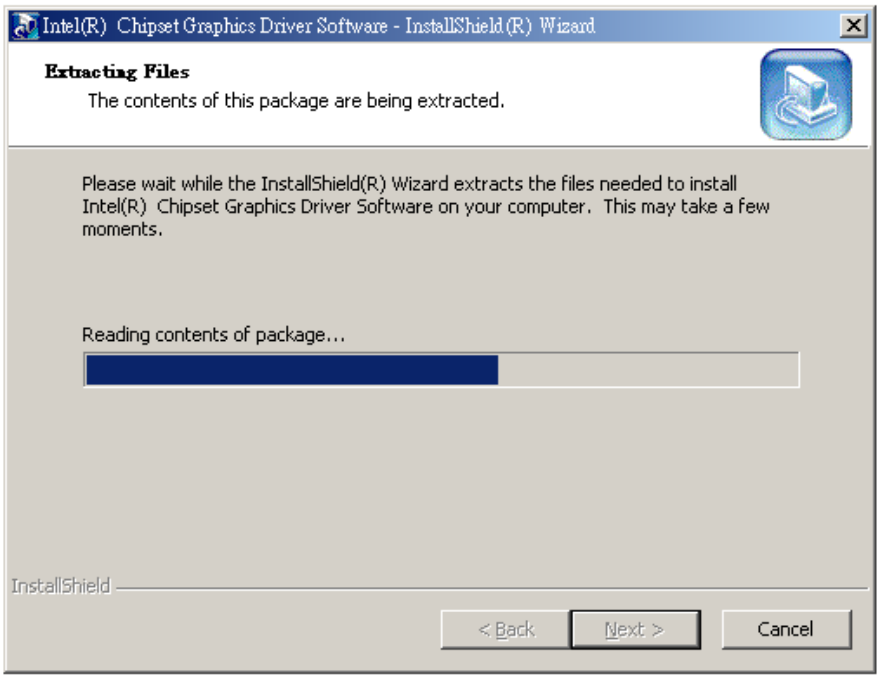
Intel(R) Chipset Graphics Driver Software - InstallShield (R) Wizard
Extracting Files
The contents of this package are being extracted.
Please wait while the InstallShield(R) Wizard extracts the files needed to install Intel(R) Chipset Graphics Driver Software on your computer. This may take a few moments.
Reading contents of package...
InstallShield
< Back
Next >
Cancel

Figure 6-7: Preparing Setup Screen

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Step 4: A Welcome screen shown in **Figure 6-8** appears. Click **NEXT** to continue the installation.

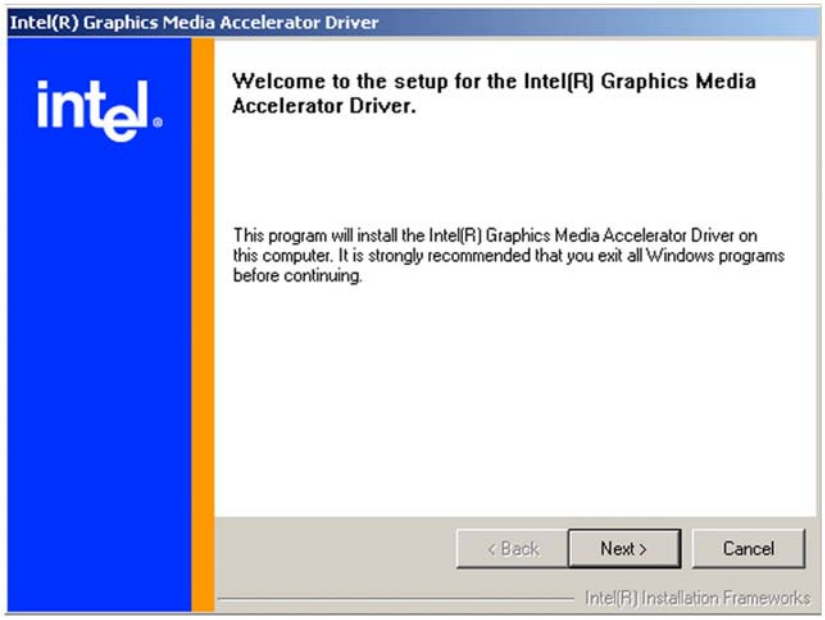
Intel(R) Graphics Media Accelerator Driver
intel
Welcome to the setup for the Intel(R) Graphics Media Accelerator Driver.
This program will install the Intel(R) Graphics Media Accelerator Driver on this computer. It is strongly recommended that you exit all Windows programs before continuing.
< Back
Next >
Cancel
Intel(R) Installation Frameworks

Figure 6-8: VGA Driver Installation Welcome Screen

Step 5: A license agreement shown in **Figure 6-9** appears. Read through the license agreement.

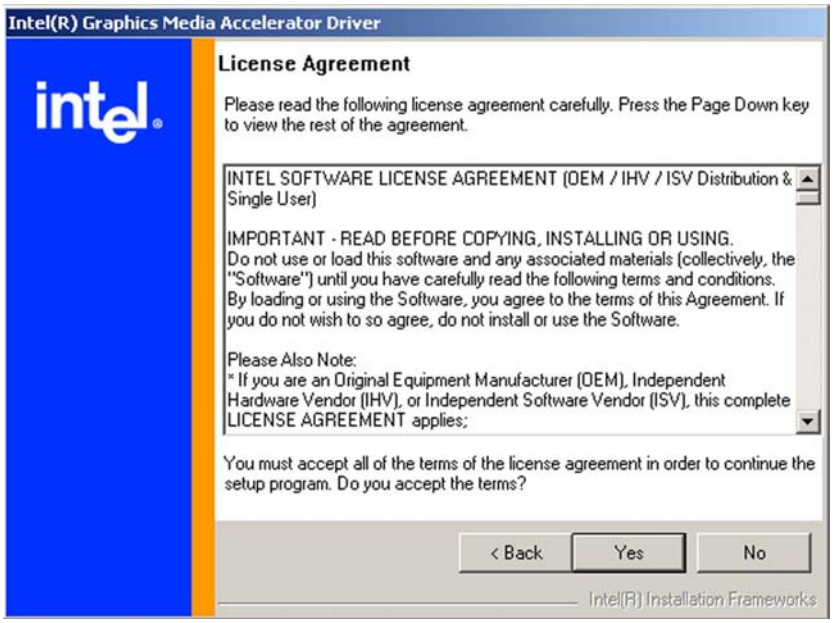
Intel(R) Graphics Media Accelerator Driver
intel
License Agreement
Please read the following license agreement carefully. Press the Page Down key to view the rest of the agreement.
INTEL SOFTWARE LICENSE AGREEMENT (OEM / IHV / ISV Distribution & Single User)
IMPORTANT - READ BEFORE COPYING, INSTALLING OR USING.
Do not use or load this software and any associated materials (collectively, the "Software") until you have carefully read the following terms and conditions. By loading or using the Software, you agree to the terms of this Agreement. If you do not wish to so agree, do not install or use the Software.
Please Also Note:
* If you are an Original Equipment Manufacturer (OEM), Independent Hardware Vendor (IHV), or Independent Software Vendor (ISV), this complete LICENSE AGREEMENT applies;
You must accept all of the terms of the license agreement in order to continue the setup program. Do you accept the terms?
< Back
Yes
No
Intel(R) Installation Frameworks

Figure 6-9: VGA Driver License Agreement

Step 6: Accept the terms and conditions stipulated in the license agreement by clicking the "**YES**" button (**Figure 6-9**). The installation notice shown in **Figure 6-10** appears.

Figure 6-10: VGA Driver Installing Notice

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Step 7: After the driver installation process is complete, a confirmation screen shown in **Figure 6-11** appears.

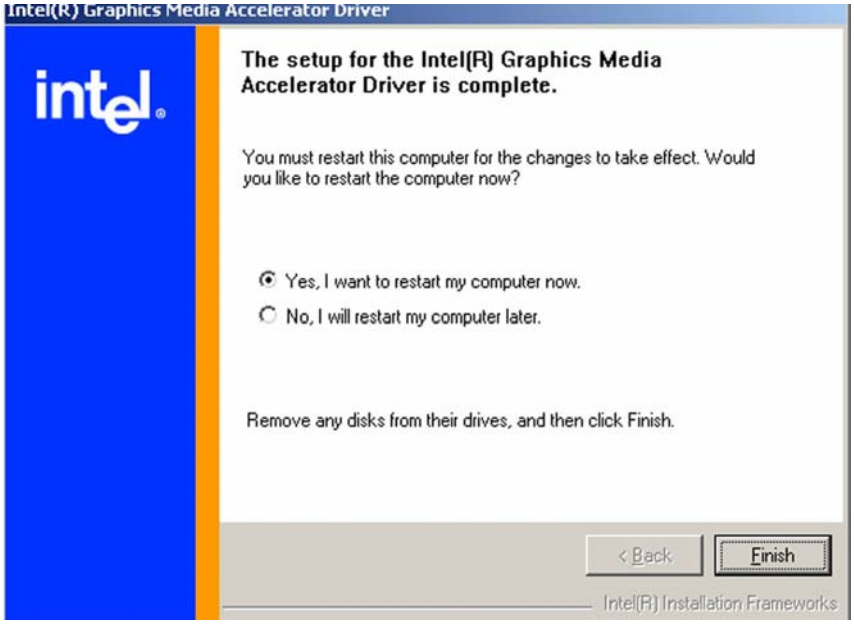
Intel(R) Graphics Media Accelerator Driver
intel
The setup for the Intel(R) Graphics Media Accelerator Driver is complete.
You must restart this computer for the changes to take effect. Would you like to restart the computer now?
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish.
< Back
Finish
Intel(R) Installation Frameworks

Figure 6-11: VGA Driver Installation Complete

Step 9: The confirmation screen shown in **Figure 6-11** allows user to restart the computer immediately after the installation is complete or to restart the computer later. For the settings to take effect the computer must be restarted. Once decided when to restart the computer, click the "**FINISH**" button.

6.4 Broadcom LAN Driver (for GbE LAN) Installation

To install the Broadcom LAN driver, please follow the steps below.

Step 1: Open **Windows Control Panel (Figure 6-12**).

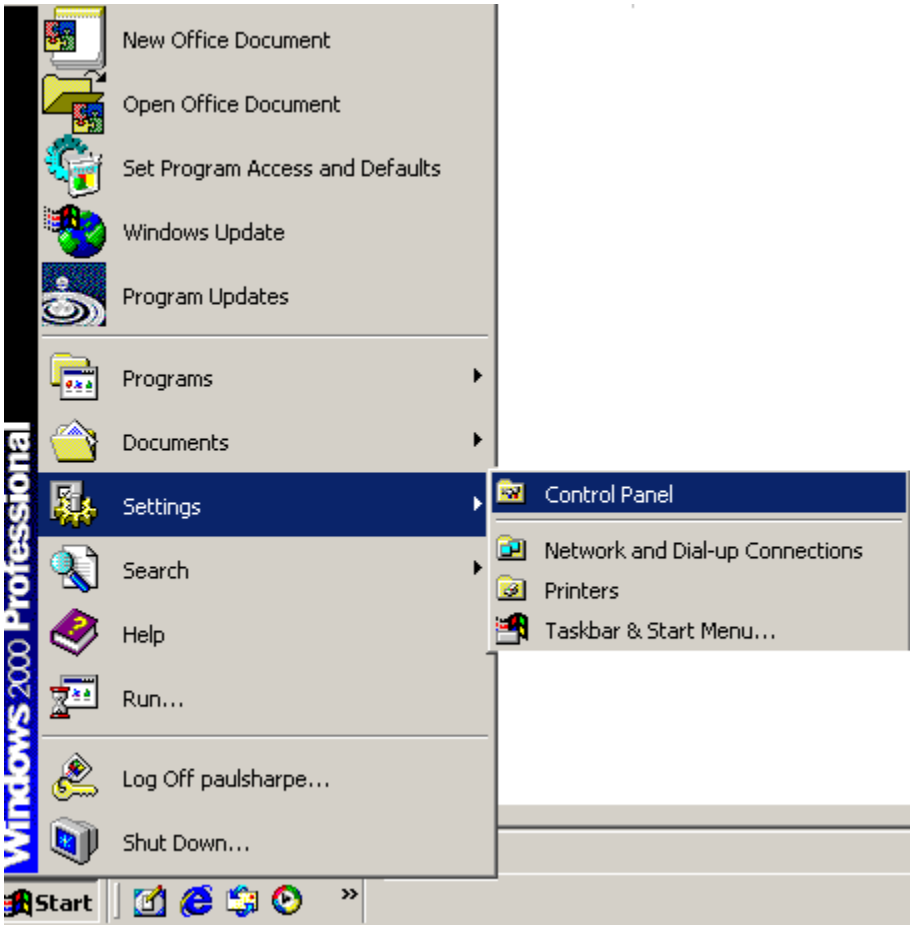

Figure 6-12: Access Windows Control Panel

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Step 2: Double click the **System** icon (**Figure 6-13**).

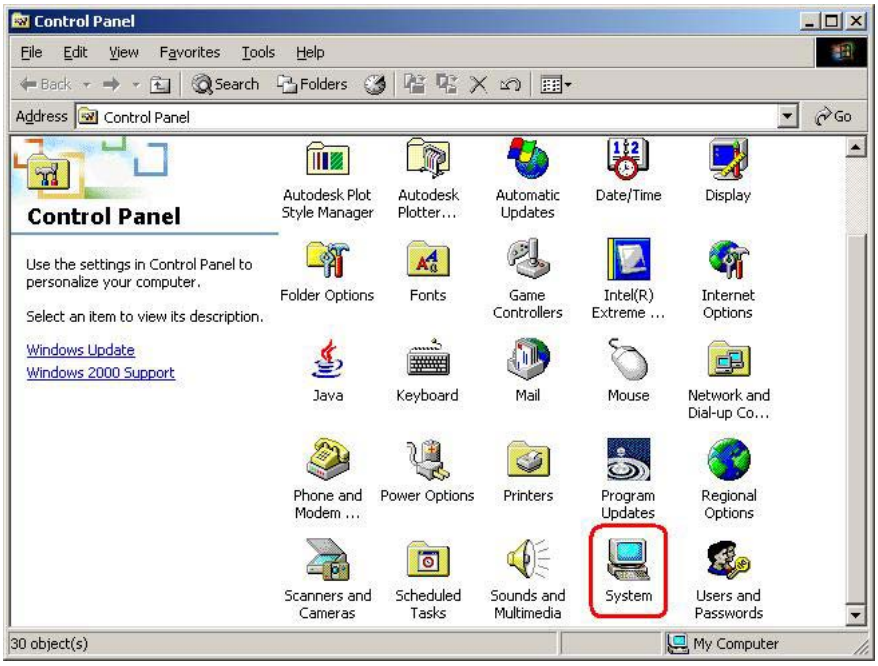

Figure 6-13: Double Click the System Icon

Step 3: Click the **Hardware Tab**, then double click **Device Manager** (**Figure 6-14**).

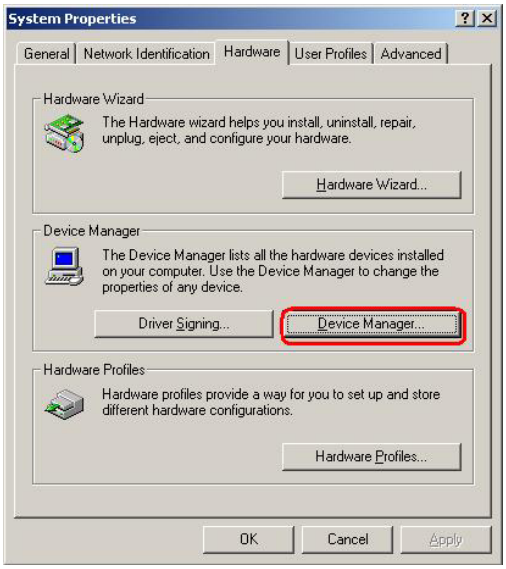
System Properties
General
Network Identification
Hardware
User Profiles
Advanced
Hardware Wizard
The Hardware wizard helps you install, uninstall, repair, unplug, eject, and configure your hardware.
Hardware Wizard...
Device Manager
The Device Manager lists all the hardware devices installed on your computer. Use the Device Manager to change the properties of any device.
Driver Signing...
Device Manager...
Hardware Profiles
Hardware profiles provide a way for you to set up and store different hardware configurations.
Hardware Profiles...
OK
Cancel
Apply

Figure 6-14: Double Click the Device Manager Tab

Step 4: A list of system hardware devices appears (**Figure 6-15**).

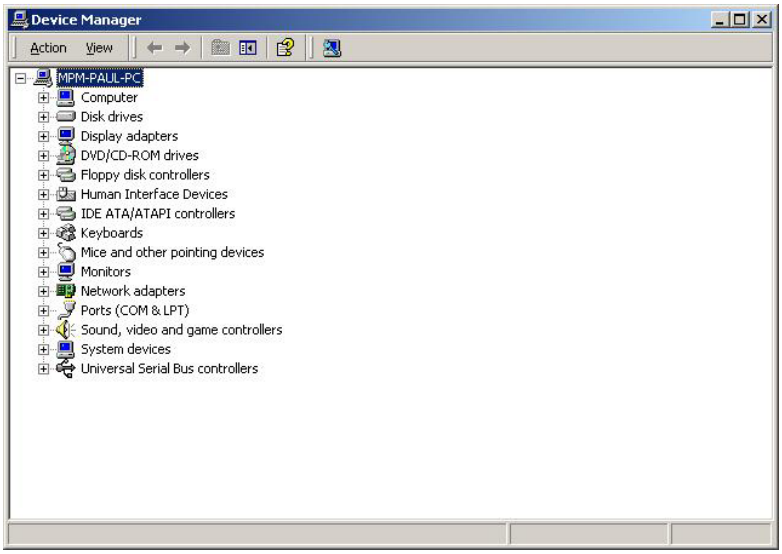

Figure 6-15: Device Manager List

Step 5: Double click the listed device that has question marks next to it. (This means Windows does not recognize the device).

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Step 6: The **Device Driver Wizard** appears (**Figure 6-16**). Click **NEXT** to continue.

Upgrade Device Driver Wizard
Install Hardware Device Drivers
A device driver is a software program that enables a hardware device to work with an operating system.
This wizard upgrades drivers for the following hardware device:
532DD36TA0379HannStar U171
Upgrading to a newer version of a device driver may add functionality to or improve the performance of this device.
What do you want the wizard to do?
Search for a suitable driver for my device (recommended)
Display a list of the known drivers for this device so that I can choose a specific driver
< Back
Next >
Cancel

Figure 6-16: Search for Suitable Driver

Step 7: Select "**Specify a Location**" in the **Locate Driver Files** window (**Figure 6-17**).

Click **NEXT** to continue.

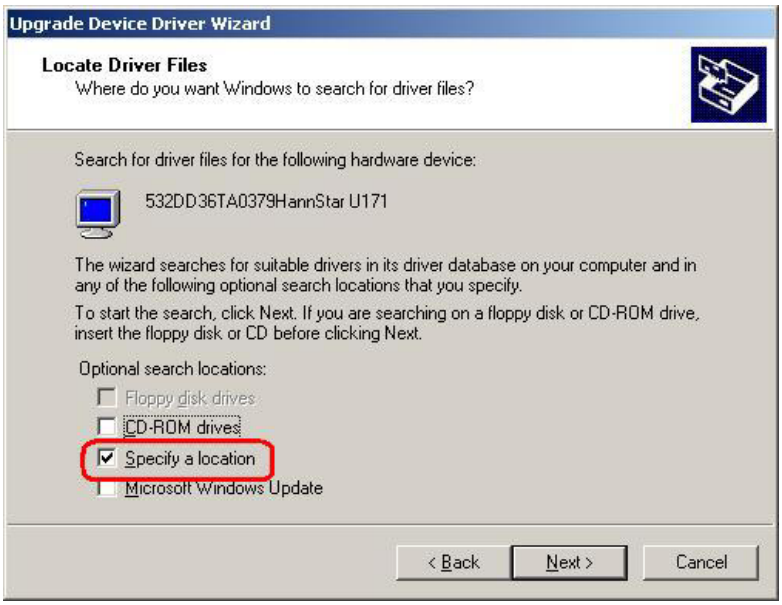
Upgrade Device Driver Wizard
Locate Driver Files
Where do you want Windows to search for driver files?
Search for driver files for the following hardware device:
532DD36TA0379HannStar U171
The wizard searches for suitable drivers in its driver database on your computer and in any of the following optional search locations that you specify.
To start the search, click Next. If you are searching on a floppy disk or CD-ROM drive, insert the floppy disk or CD before clicking Next.
Optional search locations:
Floppy disk drives
CD-ROM drives
Specify a location
Microsoft Windows Update
< Back
Next >
Cancel

Figure 6-17: Locate Driver Files

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Step 8: Select the proper OS folder under the "**X:\3-LAN\E:\3-LAN\BoadCom BCM5787**" directory (**Figure 6-18**) in the location browsing window, where "**X:\"** is the system CD drive.

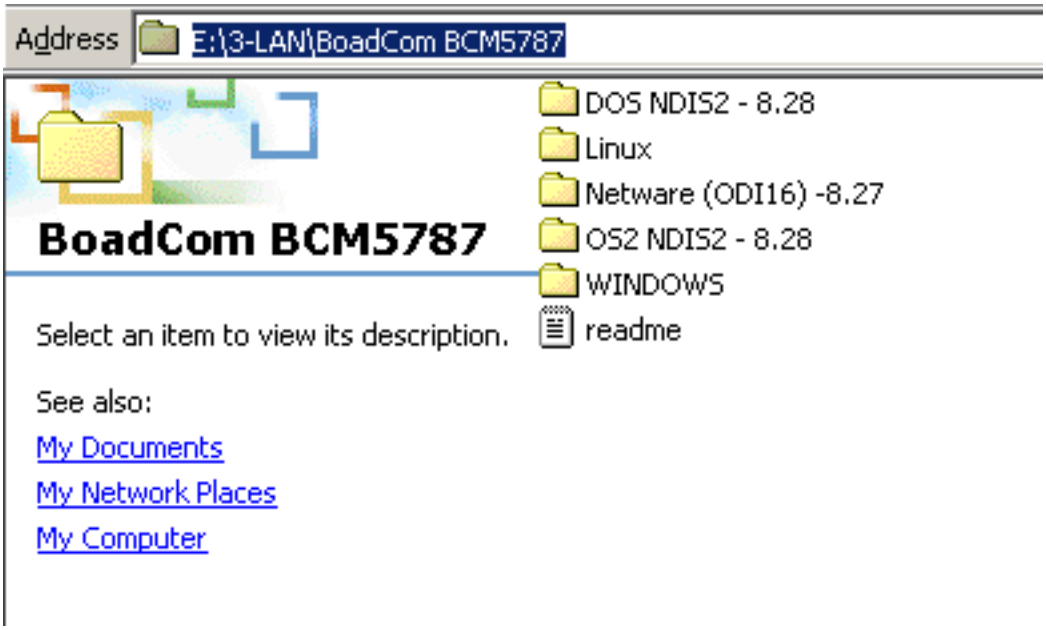

Figure 6-18: Location Browsing Window

Step 9: Click **OK** to continue. A driver files location menu window appears. Click **NEXT** to continue. The driver is installed.

6.5 Realtek AC `97 (ALC655) Audio Driver Installation

To install the Realtek AC `97 audio driver, please follow the steps below.

6.5.1.1 BIOS Setup

Step 1: Enter the BIOS setup. To do this, reboot the system and press **DEL** during POST.

Step 2: Go to the Southbridge Configuration menu. Set the **Audio Controller** option to [AC`97 Audio Only]. See **Section 5.7.2** for details.

Step 3: Press **F10** to save the changes and exit the BIOS setup. The system reboots.

6.5.1.2 Driver Installation

Step 1: Insert CyberResearch software CD.

Step 2: Click Install Drivers/CPGT Drivers, then click on the operating system you're using under the Audio heading.

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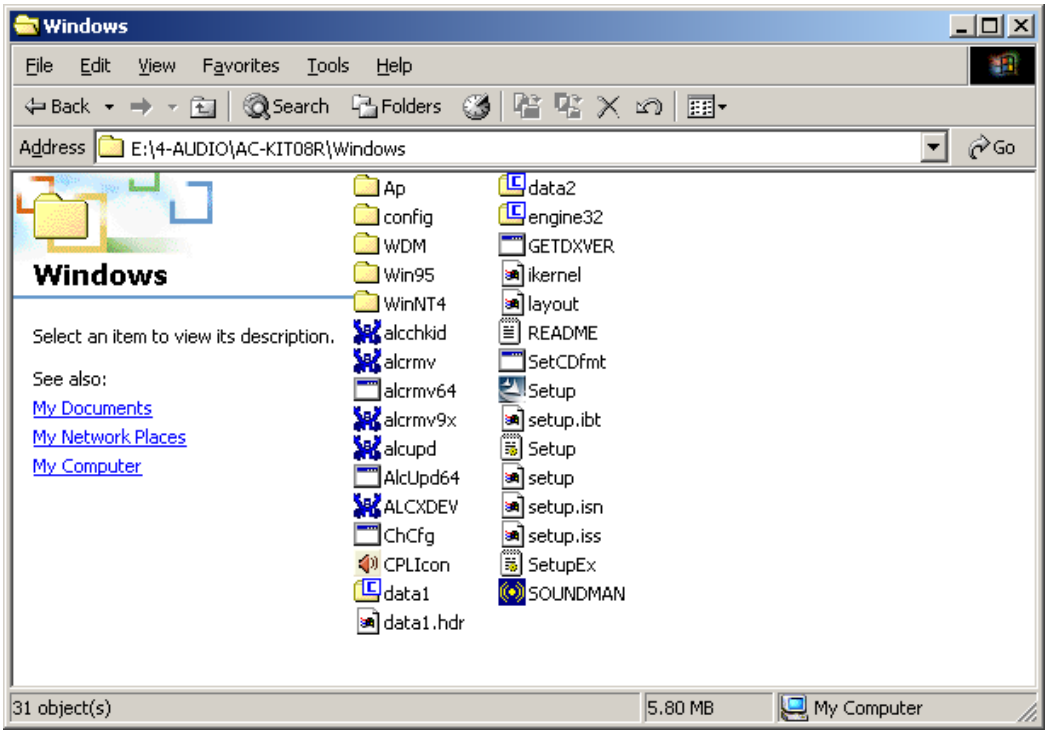

Figure 6-19

Figure 6-20: AC`97 Audio Driver Install Shield Wizard Starting

Step 3: The Realtek Audio Setup prepares the install shield to guide you through the rest of the setup process. See **Figure 6-21**.

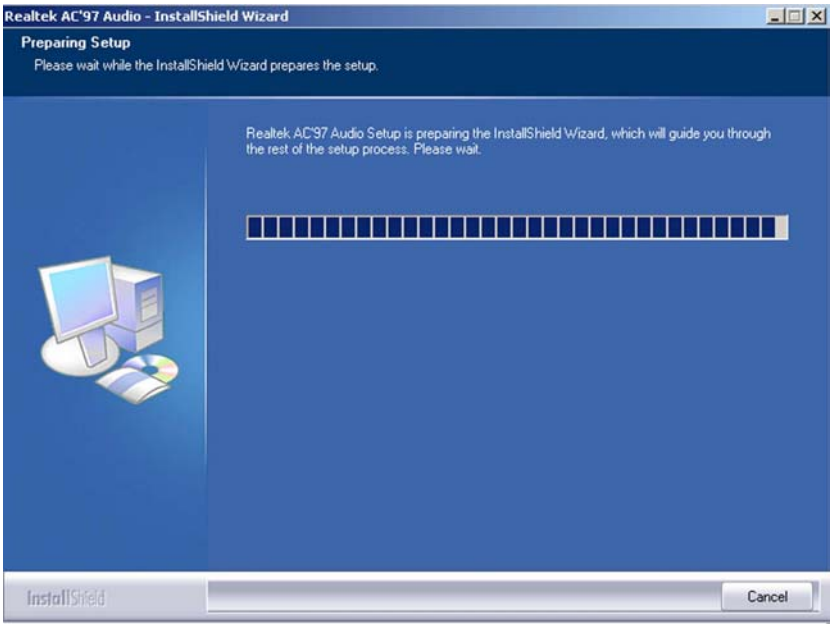
Realtek AC'97 Audio - InstallShield Wizard
Preparing Setup
Please wait while the InstallShield Wizard prepares the setup.
Realtek AC'97 Audio Setup is preparing the InstallShield Wizard, which will guide you through the rest of the setup process. Please wait.
InstallShield
Cancel

Figure 6-21: AC`97 Audio Driver Setup Preparation

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Step 4: After the install shield is prepared, the welcome screen shown in **Figure 6-22** appears. To continue the installation process, click the "**NEXT**" button. The install shield starts to configure the new software as shown in **Figure 6-23**.

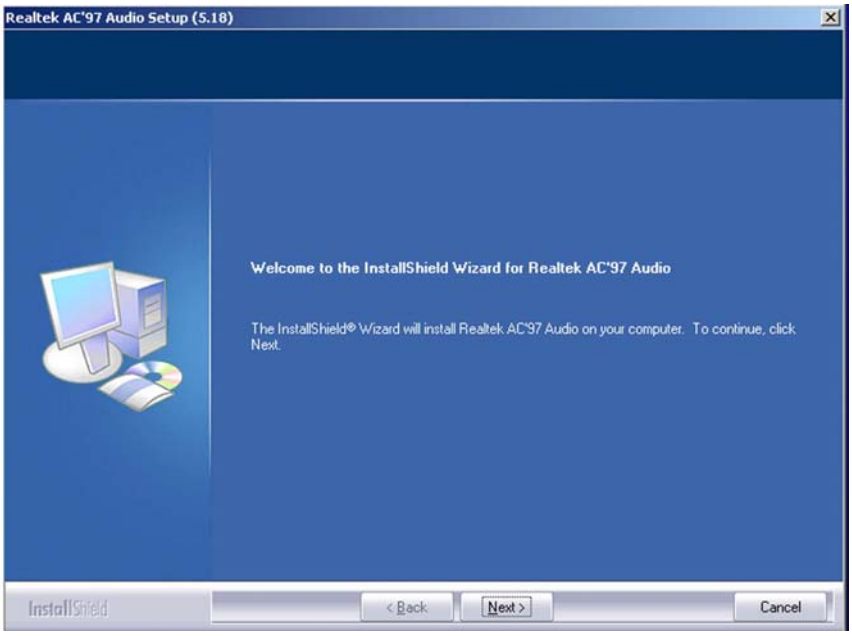
Realtek AC'97 Audio Setup (5.18)
Welcome to the InstallShield Wizard for Realtek AC'97 Audio
The InstallShield® Wizard will install Realtek AC'97 Audio on your computer. To continue, click Next.
InstallShield
< Back
Next >
Cancel

Figure 6-22: AC`97 Audio Driver Welcome Screen

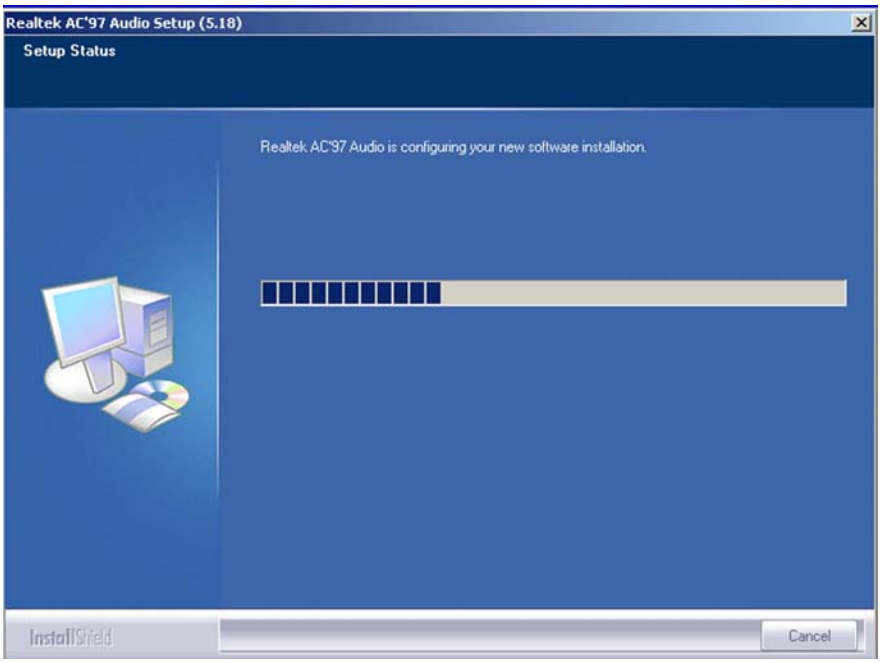

Figure 6-23: AC`97 Audio Driver Software Configuration

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Step 5: At this stage the "**Digital Signal Not Found**" screen appears (**Figure 6-24**). To continue the installation process, click the "**YES**" button.

Digital Signature Not Found
The Microsoft digital signature affirms that software has been tested with Windows and that the software has not been altered since it was tested.
The software you are about to install does not contain a Microsoft digital signature. Therefore, there is no guarantee that this software works correctly with Windows.
Realtek AC'97 Audio
If you want to search for Microsoft digitally signed software, visit the Windows Update Web site at http://windowsupdate.microsoft.com to see if one is available.
Do you want to continue the installation?
Yes
No
More Info

Figure 6-24: AC`97 Audio Driver Digital Signal

Step 6: After clicking the "**YES**" button in **Figure 6-24**, the installation of the driver begins (**Figure 6-25**).

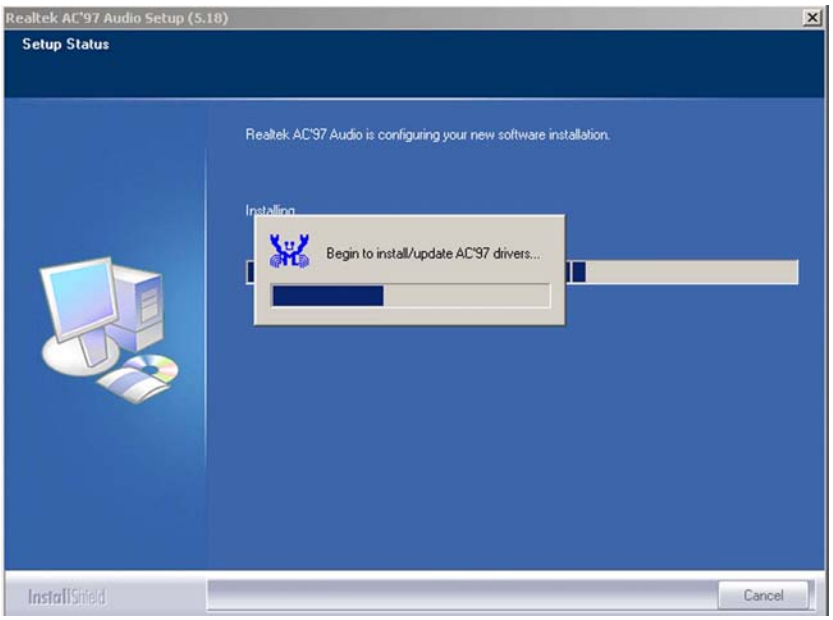

Figure 6-25: AC`97 Audio Driver Installation Begins

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Step 7: After the driver installation process is complete, a confirmation screen shown in **Figure 6-26** appears.

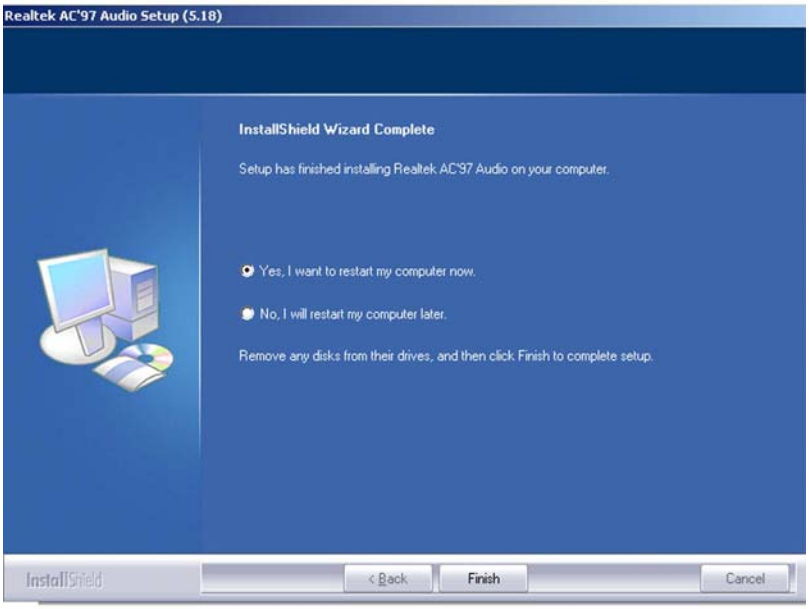
Realtek AC'97 Audio Setup (5.18)
InstallShield Wizard Complete
Setup has finished installing Realtek AC'97 Audio on your computer.
Yes, I want to restart my computer now.
No, I will restart my computer later.
Remove any disks from their drives, and then click Finish to complete setup.
InstallShield
< Back
Finish
Cancel

Figure 6-26: AC`97 Audio Driver Installation Complete

Step 8: The confirmation screen shown in Figure 6-26 allows you to restart the computer immediately after the installation is complete or to restart the computer later. For the settings to take effect the computer must be restarted. Once you have decided when to restart the computer, click the "**FINISH**" button.

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Appendix

A

BIOS Configuration Options

A.1 BIOS Configuration Options

Below is a list of BIOS configuration options described in **Chapter 5.**

- ➔ **System Overview 98**
- ➔ **ATA/IDE Configuration [Compatible] 102**
- ➔ **Legacy IDE Channels [SATA Pri, PATA Sec] 103**
- ➔ **IDE Master and IDE Slave 103**
- ➔ **Type [Auto] 105**
- ➔ **ZIP 105**
- ➔ **LS-120 ..... 105**
- ➔ **LBA/Large Mode [Auto] 105**
- ➔ **Block (Multi Sector Transfer) [Auto] 106**
- ➔ **PIO Mode [Auto] 106**
- ➔ **DMA Mode [Auto] 107**
- ➔ **S.M.A.R.T [Auto] 107**
- ➔ **32Bit Data Transfer [Enabled] 107**
- ➔ **Floppy A/B [1.44 MB 3½"] 109**
- ➔ **On-board Floppy Controller [Enabled] 110**
- ➔ **Serial Port1 Address [3F8/IRQ4] 110**
- ➔ **Serial Port2 Address [2F8/IRQ3] 111**
- ➔ **Serial Port2 Mode [Normal] 111**
- ➔ **Parallel Port Address [378] 112**
- ➔ **Parallel Port Mode [Normal] 112**
- ➔ **Parallel Port IRQ [IRQ7] 113**
- ➔ **CPU FAN Mode Setting: [Manual Mode] 115**
- ➔ **CPUFAN0 PWM Control 115**
- ➔ **CPUFAN0 TargetTemp Value 115**
- ➔ **CPUFAN0 Tolerance Value 115**
- ➔ **CPUFAN0 StartUp Value 115**
- ➔ **CPUFAN0 Stop Value 115**
- ➔ **CPUFAN0 StopTime Value 115**

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➔ **CPUFAN0 TargetSpeed Value 116**
➔ **CPUFAN0 Tolerance Value 116**
➔ **CPUFAN0 StopTime Value 116**
➔ **ACPI Aware O/S [Yes] 117**
➔ **Suspend mode [Auto] 119**
➔ **Repost Video on S3 Resume [Yes] 119**
➔ **Power Management/APM [Enabled] 120**
➔ **Power Button Mode [On/Off] 121**
➔ **Resume on Ring [Disabled] 121**
➔ **Resume On RTC Alarm [Disabled] 121**
➔ **RTC Alarm Date (Days) 122**
➔ **RTC Alarm Time 122**
➔ **MPS Revision [1.4] 123**
➔ **USB Configuration 124**
➔ **USB Devices Enabled 124**
➔ **Legacy USB Support [Enabled] 124**
➔ **Port 64/60 Emulation [Disabled] 125**
➔ **USB2.0 Controller Mode [HiSpeed] 125**
➔ **BIOS EHCI Handoff [Enabled] 126**
➔ **Clear NVRAM [No] 128**
➔ **Plug & Play O/S [No] 129**
➔ **PCI Latency Timer [64] 129**
➔ **Allocate IRQ to PCI VGA [Yes] 130**
➔ **Palette Snooping [Disabled] 130**
➔ **PCI IDE BusMaster [Enabled] 131**
➔ **OffBoard PCI/ISA IDE Card [Auto] 131**
➔ **IRQ# [Available] 132**
➔ **DMA Channel# [Available] 133**
➔ **Reserved Memory Size [Disabled] 133**
➔ **Quick Boot [Enabled] 135**
➔ **AddOn ROM Display Mode [Force BIOS] 135**
➔ **Bootup Num-Lock [On] 136**

➔ **PS/2 Mouse Support [Auto] 137**
➔ **Change Supervisor Password 141**
➔ **Change User Password 142**
➔ **Boot Sector Virus Protection [Disabled] 142**
➔ **DRAM Frequency [Auto] 144**
➔ **Configure DRAM Timing by SPD [Enabled] 145**
➔ **Memory Hole [Disabled] 145**
➔ **Initiate Graphic Adapter [PEG/PCI] 146**
➔ **Internal Graphics Mode Select [Enabled, 8MB] 146**
➔ **DVMT Mode Select [DVMT Mode] 147**
➔ **DVMT/FIXED Memory [128MB] 148**
➔ **Audio Controller [Auto] 150**
➔ **Onboard LAN1 [Auto] 150**
➔ **Onboard LAN2 [Auto] 150**
➔ **Onboard Lan Rom [Disabled] 151**
➔ **Save Changes and Exit 152**
➔ **Discard Changes and Exit 152**
➔ **Discard Changes 152**
➔ **Load Optimal Defaults 153**
➔ **Load Failsafe Defaults 153**

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Appendix

B

DIO Connector

B.1 DIO Interface Introduction

The DIO connector on the CPGx Series is interfaced to GIO ports on the Winbond W83627EHG Super I/O chipset. The DIO has both 4-bit digital inputs and 4-bit digital outputs. The digital inputs and digital outputs are generally control signals that control the on/off circuit of external devices or TTL devices. Data can be read or written to the selected address to enable the DIO functions.

NOTE:

For further information, please refer to the Winbond datasheet for the Winbond W83627EHG Super I/O chipset.

B.2 DIO Connector Pinouts

The following table describes how the DIO connector pins are connected to the Super I/O GPIO port 1.

Pin No	Description	Super I/O Pin	Super I/O Pin Descripton
1	Ground	N/A	N/A
2	VCC	N/A	N/A
3	Output 0	GP14	General purpose I/O port 1 bit 4.
4	Output 1	GP15	General purpose I/O port 1 bit 5.
5	Output 2	GP16	General purpose I/O port 1 bit 6.
6	Output 3	GP17	General purpose I/O port 1 bit 7.
7	Input 0	GP10	General purpose I/O port 1 bit 0.
8	Input 1	GP11	General purpose I/O port 1 bit 1
9	Input 2	GP12	General purpose I/O port 1 bit 2
10	Input 3	GP13	General purpose I/O port 1 bit 3

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B.3 Assembly Language Samples

B.3.1 Enable the DIO Input Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O input functions is listed below.

MOV	**AX, 6F08H**	Sets the digital port as input
INT	**15H**	Initiates the INT 15H BIOS call

B.3.2 Enable the DIO Output Function

The BIOS interrupt call INT 15H controls the digital I/O. An assembly program to enable digital I/O output functions is listed below.

MOV	**AX, 6F09H**	Sets the digital port as output
MOV	**BL, 09H**	
INT	**15H**	Initiates the INT 15H BIOS call

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Appendix

C

Watchdog Timer

The Watchdog Timer is provided to ensure that standalone systems can always recover from catastrophic conditions that cause the CPU to crash. This condition may have been caused by a software bug. When the CPU stops working correctly, hardware on the board will perform a hardware reset (cold boot) to bring the system back to a known state.

A BIOS function call (INT 15H) is used to control the Watchdog Timer.

- **INT 15H:**

AH – 6FH
Sub-function: **AL – 2** : Sets the Watchdog Timer's time-out period. **BL** : Time-out value (Its unit-second is dependent on the item "Watchdog Timer unit select" in CMOS setup).

Table C-1: AH-6FH Sub-function

Sub-function 2 must be called to set the time-out period of Watchdog Timer first. If the time-out value is not zero, the Watchdog Timer will start counting down. When the timer value reaches zero, the system will reset. To ensure that this reset condition does not occur, the Watchdog Timer must be periodically refreshed by calling sub-function 2. Note that the Watchdog timer will be disabled if the time-out value is set to zero.

A tolerance of at least 10% must be maintained to avoid unknown routines within the operating system (DOS), such as disk I/O that can be very time-consuming.

NOTE:

For inquiries, refer to the original datasheets or contact the CyberResearch, Inc. Customer Service Department.

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NOTE:

When exiting a program, it is necessary to disable the Watchdog Timer; otherwise, the system will reset.

Example Program:

```
; INITIAL TIMER PERIOD COUNTER
;
W_LOOP:
        MOV     AX, 6F02H           ;setting the time-out value
        MOV     BL, 30              ;time-out value is 48 seconds
        INT      15H
;
; ADD YOUR APPLICATION PROGRAM HERE
;
        CMP      EXIT_AP, 1         ;is your application over?
        JNE      W_LOOP             ;No, restart your application

        MOV     AX, 6F02H           ;disable Watchdog Timer
        MOV     BL, 0               ;
        INT      15H
;
; EXIT
;
```

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Appendix

D

Address Mapping

D.1 IO Address Map

I/O address Range	Description
000-01F	DMA Controller
020-021	Interrupt Controller
040-043	System time
060-06F	Keyboard Controller
070-07F	System CMOS/Real time Clock
080-09F	DMA Controller
0A0-0A1	Interrupt Controller
0C0-0DF	DMA Controller
0F0-0FF	Numeric data processor
1F0-1F7	Primary IDE Channel
2F8-2FF	Serial Port 2 (COM2)
378-37F	Parallel Printer Port 1 (LPT1)
3B0-3BB	Intel(R) 945G Graphics Controller
3C0-3DF	Intel(R) 945G Graphics Controller
3F6-3F6	Primary IDE Channel
3F7-3F7	Standard floppy disk controller
3F8-3FF	Serial Port 1 (COM1)

Table D-1: IO Address Map

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D.2 1st MB Memory Address Map

Memory address	Description
00000-9FFFF	System memory
A0000-BFFFF	VGA buffer
F0000-FFFFF	System BIOS
1000000-	Extend BIOS

Table D-2: 1st MB Memory Address Map

D.3 IRQ Mapping Table

IRQ0	System Timer	IRQ8	RTC clock
IRQ1	Keyboard	IRQ9	ACPI
IRQ2	Available	IRQ10	LAN
IRQ3	COM2	IRQ11	LAN/USB2.0/SATA
IRQ4	COM1	IRQ12	PS/2 mouse
IRQ5	SMBus Controller	IRQ13	FPU
IRQ6	FDC	IRQ14	Primary IDE

Table D-3: IRQ Mapping Table

D.4 DMA Channel Assignments

Channel	Function
0	Available
1	Available
2	Floppy disk (8-bit transfer)
3	Available
4	Cascade for DMA controller 1
5	Available
6	Available
7	Available

Table D-4: IRQ Mapping Table

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Appendix

E

External AC'97 Audio CODEC

E.1 Introduction

The audio functionalities of the CPGx Series CPU card can be accessed utilizing the CPGx audio kit. The audio kit is comprised of:
Realtek ALC655, a 16-bit, full duplex AC'97 2.3 compatible audio CODEC with 48KHz sampling rate. The audio kit functionality is interfaced through three (3) phone jack connectors and two (2) pin headers including:

1. A LINE input shared with surround output
2. A MIC input shared with Center and LFE output
3. A LINE output
4. Analog line-level stereo inputs with 5-bit volume control: CDIN1 and AUXIN1.

Both Front_out and Surround_out are equipped with a built-in 50mW/20ohm amplifier. The ALC655 supports host/soft audio from Intel® ICHx chipsets as well as audio controller based VIA/SIS/Ali/ATI chipset with bundled Windows® series drivers (XP/ME/2000/98/NT), EAX/Direct Sound 3D/I3DL2/A3D compatible sound effect utilities supporting Karaoke, 26 kinds of environment sound emulations with 10-band equalizer, and HRTF 3D positional audio. The audio kit provides an excellent entertainment package sufficient for today's multimedia systems.

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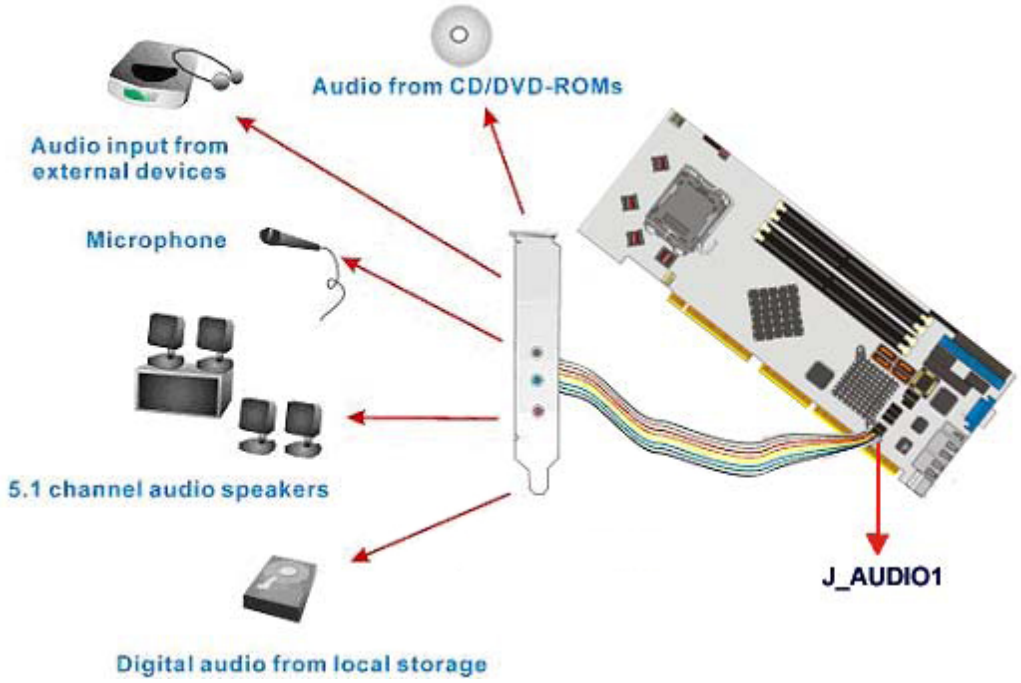

Figure E-1: CPGx Audio Kit

E.2 Physical Connection

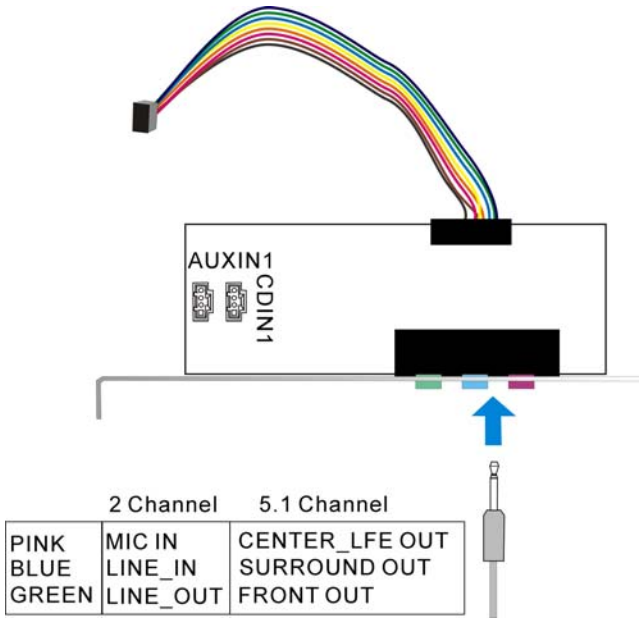

Figure E-2: CPGx Audio Kit Connectors

The audio kit comes with a PCI slot bracket for the installation into a PC case or rackmount chassis. Connect the 10-pin header to the J_AUDIO1 header as shown above, and if necessary, connect the CDIN1 and AUXIN1 to optical drives or other audio sources, e.g., an MPEG card, using a 4-pin cable. Note that depending on the devices you connect to, the phone jacks have different functions with different audio installation modes (2 channel or 5.1 channel modes).

E.3 Driver Installation

The driver installation has been described in **Chapter 6**.

After reboot, you should be able to find the sound effect configuration utility in Windows Control Panel (see **Figure E-3**); and if peripheral speakers have been properly connected, hear the sound effects.

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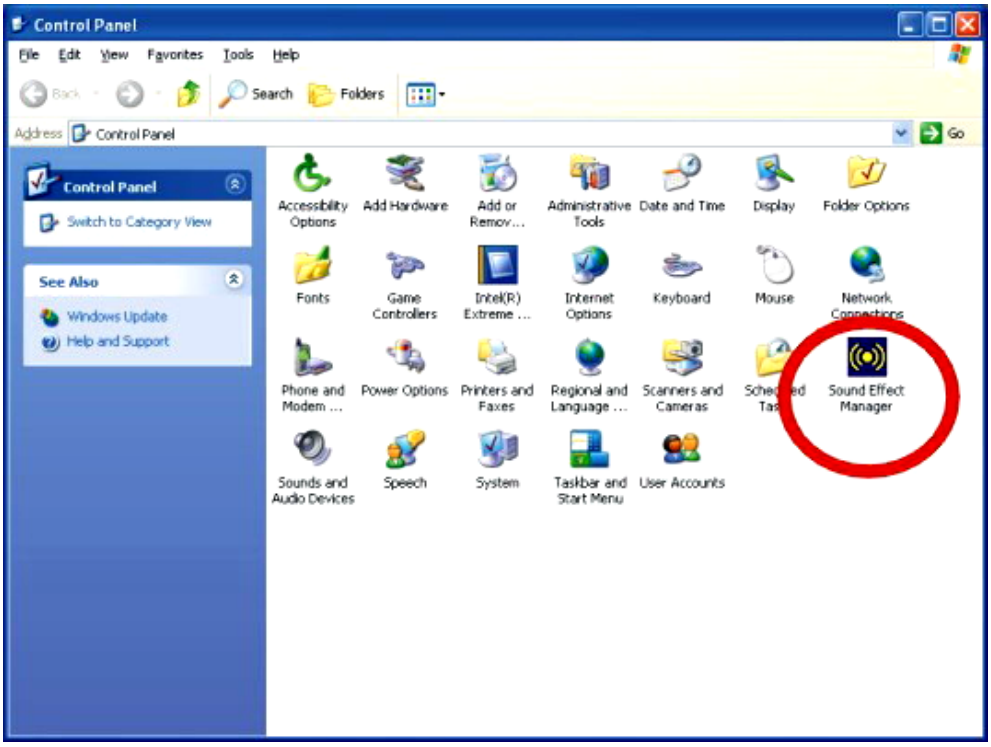

Figure E-3: Sound Effect Manager Icon

E.4 Sound Effect Configuration

After installing the audio CODEC driver, you should be able to use the multi-channel audio features now. Click the audio icon from the Notification Area from system task bar (see **Figure E-5**). The shortcut to the configuration utility is also available through the **Sound Effect Manager** icon in the **Control Panel** (**Figure E-4**).

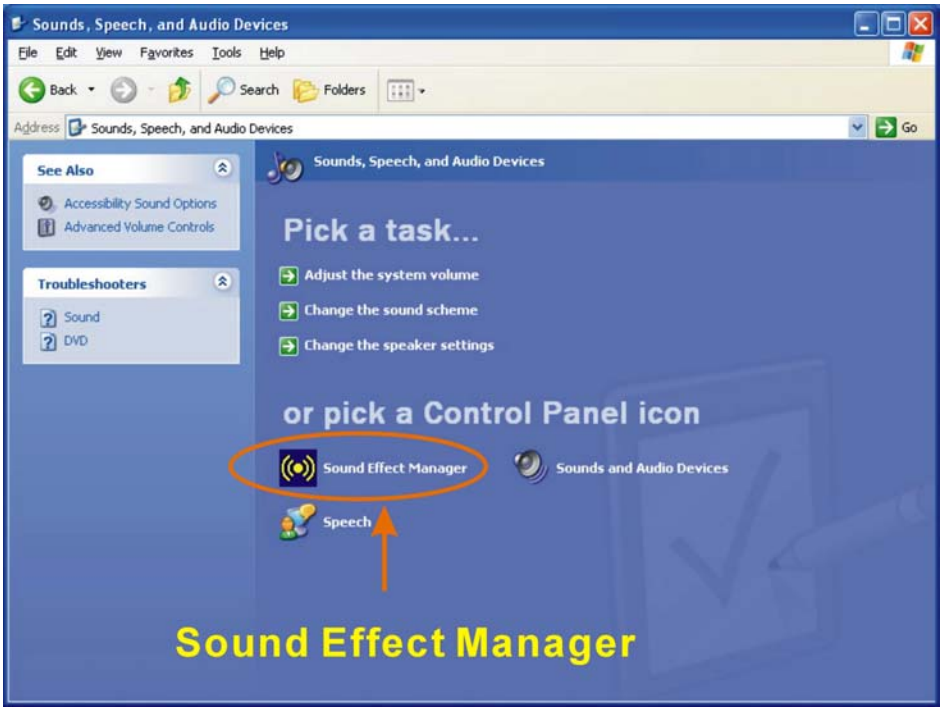

Figure E-4: Sound Effect Manager Icon [Control Panel]

Figure E-5: Sound Effect Manager Icon [Task Bar]

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E.5 Sound Effect

You may select a pre-configured sound environment setting with the preset equalizer settings. You may also load an equalizer setting or make a new equalizer setting using the "**Load EQ Setting**" and "**Save Preset**" button. (See **Figure E-7**)

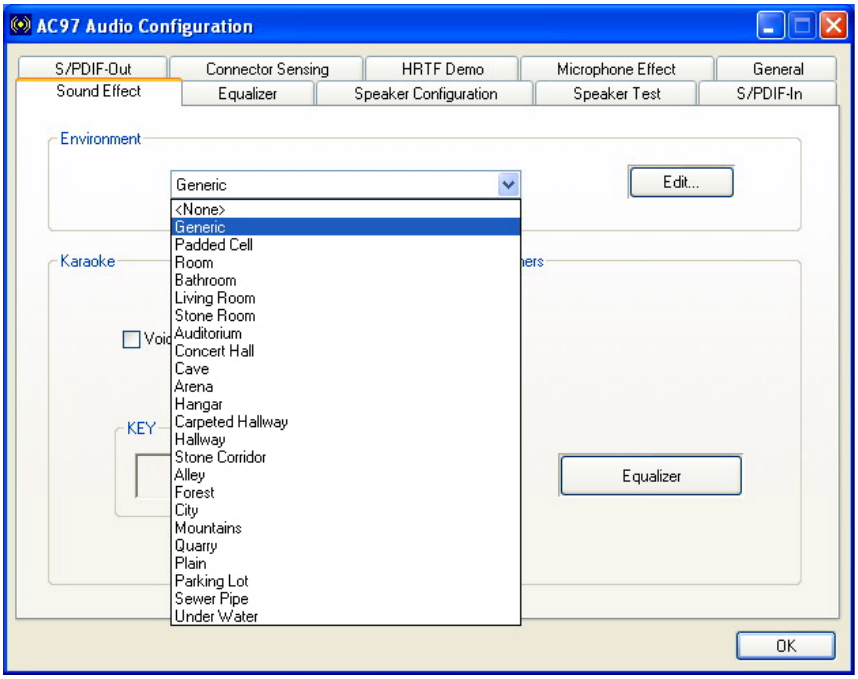

Figure E-6: Setting Sound Effects

E.6 Environment Simulation

This is the default screen whenever the configuration utility is opened.

You may select different sound environment modes by a single click on the Environment pull-down list. There are a total of 23 preset environment modes (see **Figure E-7**). You may also fine-tune the environment setting by clicking the **Edit** button on the right, which displays an editor window. Select a preset mode you want to edit. Select a preset mode, and then select one the property value from the list below by a single click. Use the scroll bar below to adjust properties setting. When the adjustment is done, click the **Save** button to proceed.

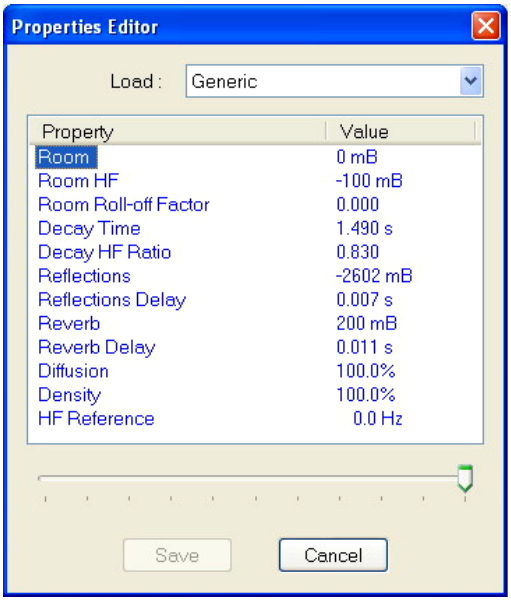

Figure E-7: Sound Effects Properties Editor

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E.7 Karaoke Mode

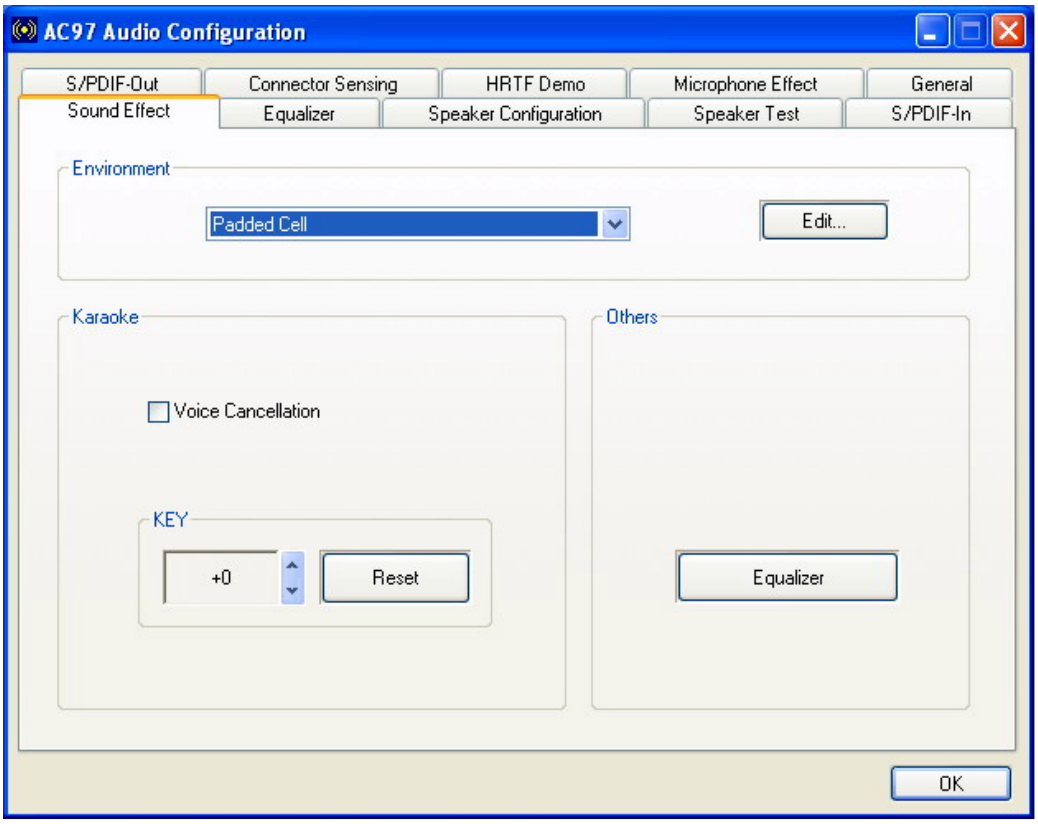

Figure E-8: Karaoke Mode

The Karaoke mode shown in **Figure E-8** allows you to eliminate the vocal of the music you play or adjust the key to accommodate your range.

The configuration options that come with the Karaoke function include:

1. **Voice Cancellation**: This checkbox, when selected, disables the vocal part of the music your play in your computer while the background music remains.

2. **Key adjustment**: Use the Up or Down arrow icons to find a key that fits your vocal range.

NOTE:

The Equalizer button on the default display brings you to the same configuration window as the Equalizer function tab on top of the window.

E.8 Equalizer Selection

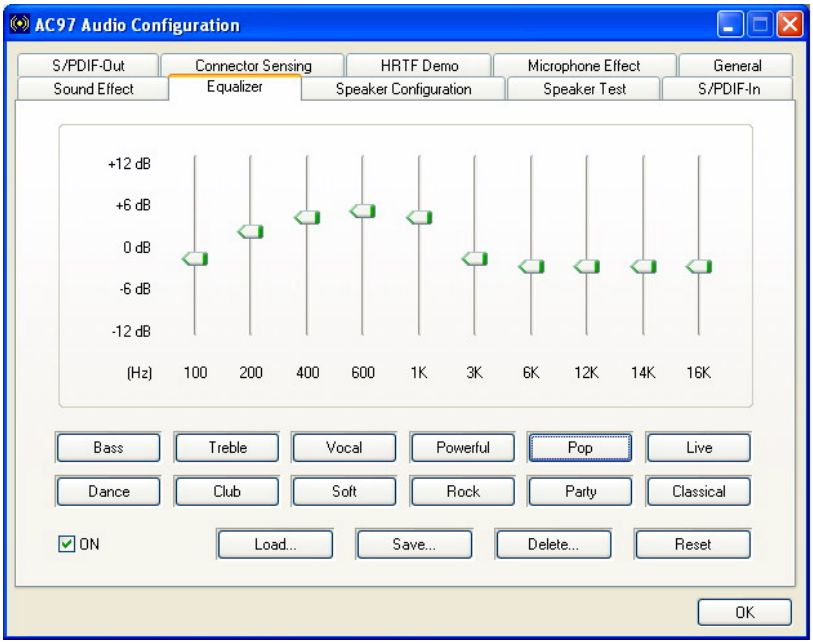

Figure E-9: Equalizer Settings

The equalizer in **Figure E-9** allows users to change sound effect parameters. The default screen shows equalized values. You may also select preset modes from the buttons below. The configurable values include 10 bands of equalizer ranging from 100Hz to 16KHz. Use the scroll bar to fine-tune, and use the **Load**, **Save**, **Delete**, and **Reset** buttons to edit your settings.

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E.9 Speaker Configuration

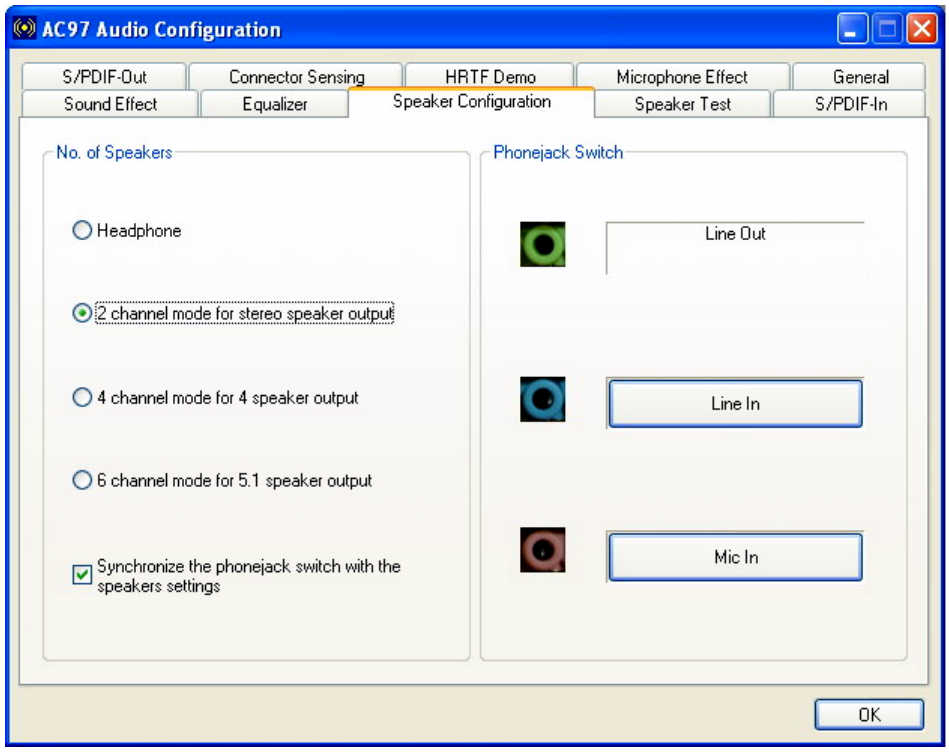

Figure E-10: Speaker Configuration

In this functional window, you can configure your multi-channel speaker settings.

Select the audio configuration from the **No. of Speakers** section on the left by clicking on one of the check circles.

The configurable options are:

1. Headphone
2. Channel mode for stereo speaker output
3. Channel mode for 4 speaker output
4. Channel mode for 5.1 speaker output
5. Synchronize the phonejack switch with speakers settings

Select a speaker configuration by selecting its check circle, and then click **OK** to apply the configuration change.

Connect your speakers to the corresponding phonejacks. It is recommended you write down your configuration, power off the system, and then complete the physical connections.

Select from the **Phonejack Switch** section if you want to re-define the phonejacks. Click the specific phonejack button for several times to change its input/output functionality.

E.10 Speaker Test

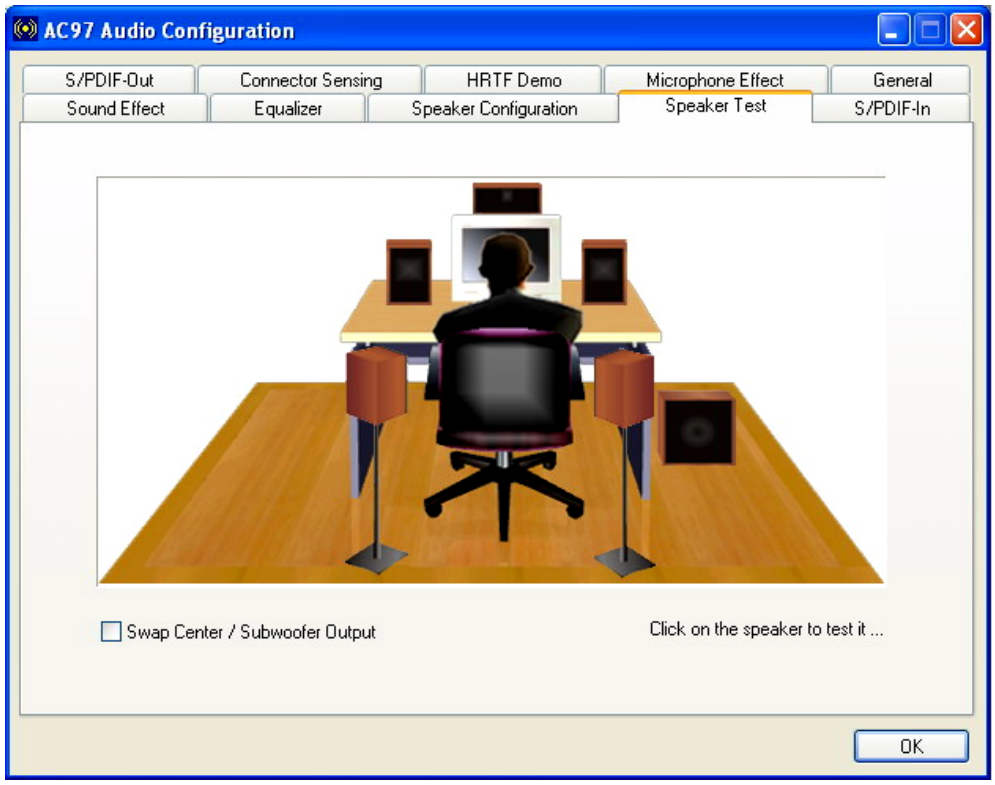

Figure E-11: Audio Configuration

The audio configuration window in **Figure E-11** allows you to test each connected speaker to see if your 4-channel or 6-channel audio operates properly. If any speaker malfunctions, you should then check the cabling or replace the malfunctioning parts.

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Select each specific speaker to test its functionality. The speaker you select will be highlighted and sound should be generated.

NOTE:

1. The test scenario that appears in the **Speaker Test** window corresponds to the number of speakers you selected in the **Sound Effect** window.

2. You should select and deselect the **Swap Center/Subwoofer Output** check box to see if these two devices properly work.

E.11 S/PDIF-In & S/PDIF-Out

These functions are currently not supported.

E.12 Connector Sensing

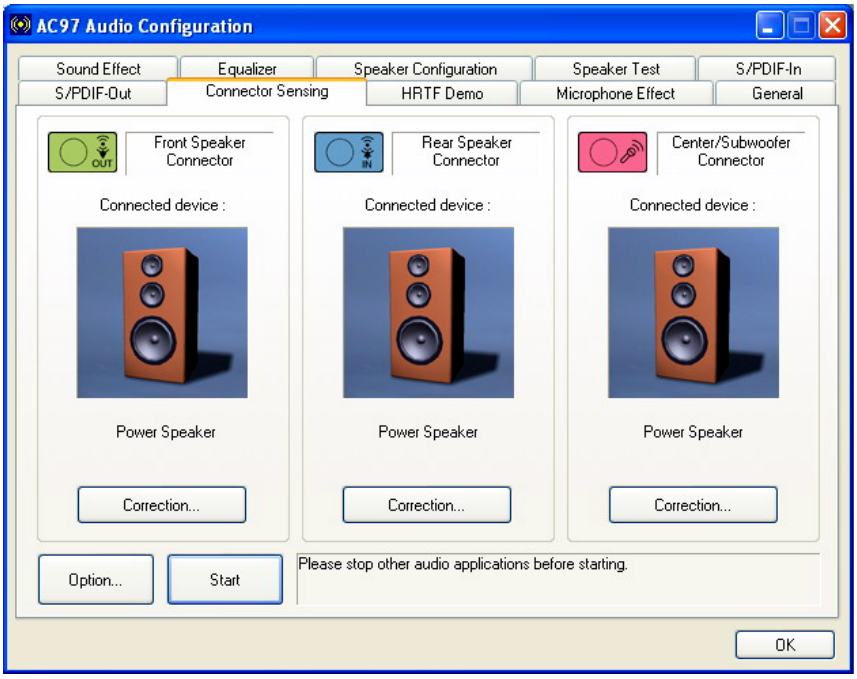

Figure E-12: Connector Sensing

Realtek ALC655/883 supports Jack Sensing functionality. If an audio device is plugged into the wrong connector, a warning message will display informing users to correct the physical connections.

Click the Start button in **Figure E-12** to start the sensing. Please remember to close all running audio-related programs before executing the sensing operation.

The EZ-Connection screen in **Figure E-13** shows the result of sensing test.

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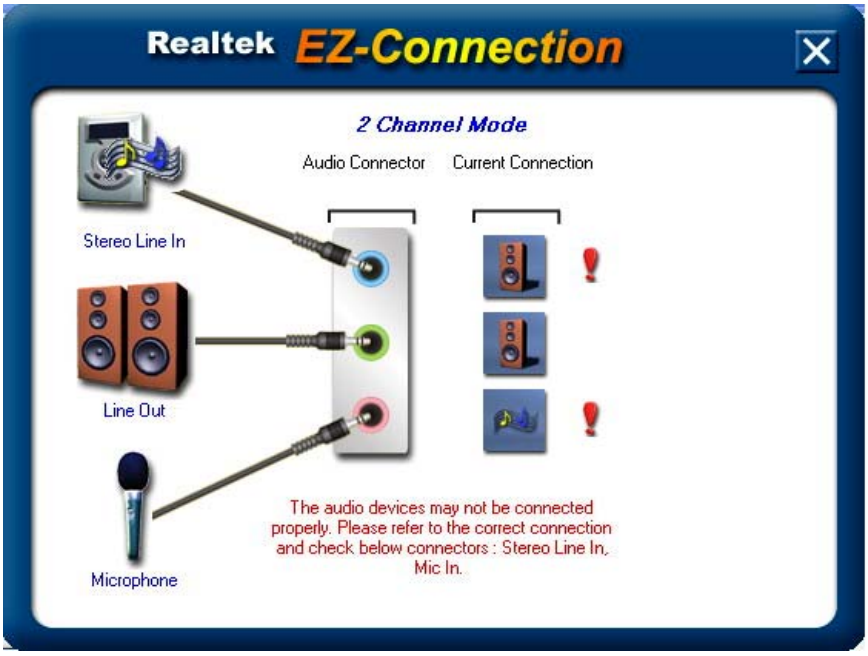
Realtek EZ-Connection
2 Channel Mode
Audio Connector
Current Connection
Stereo Line In
Line Out
Microphone
The audio devices may not be connected properly. Please refer to the correct connection and check below connectors : Stereo Line In, Mic In.

Figure E-13: EX Connection

The “Audio Connector” column shows the settings used in the “Speaker Configuration” window.

The “Current Connection” column shows the types of devices detected during test. If the result does not match the physical connection, an exclamation mark will appear. (See **Figure E-14**)

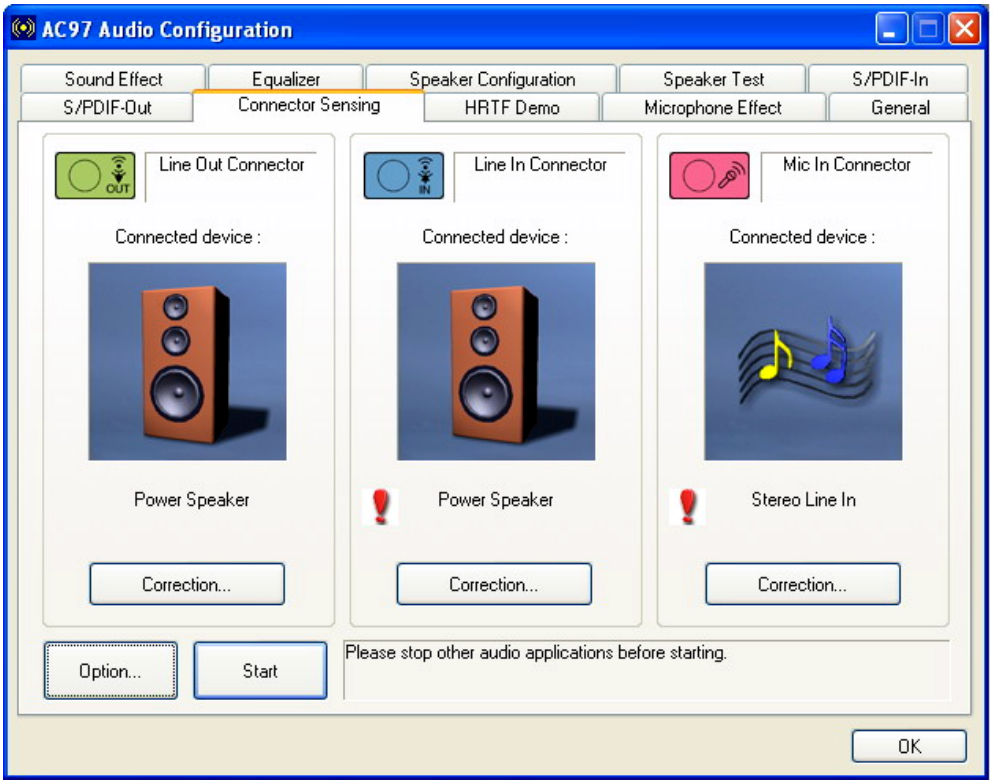

Figure E-14: Connector Sensing Test Result

After closing the EZ-Connector screen, the following window should appear showing the latest connection status.

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E.13 HRTF Demo

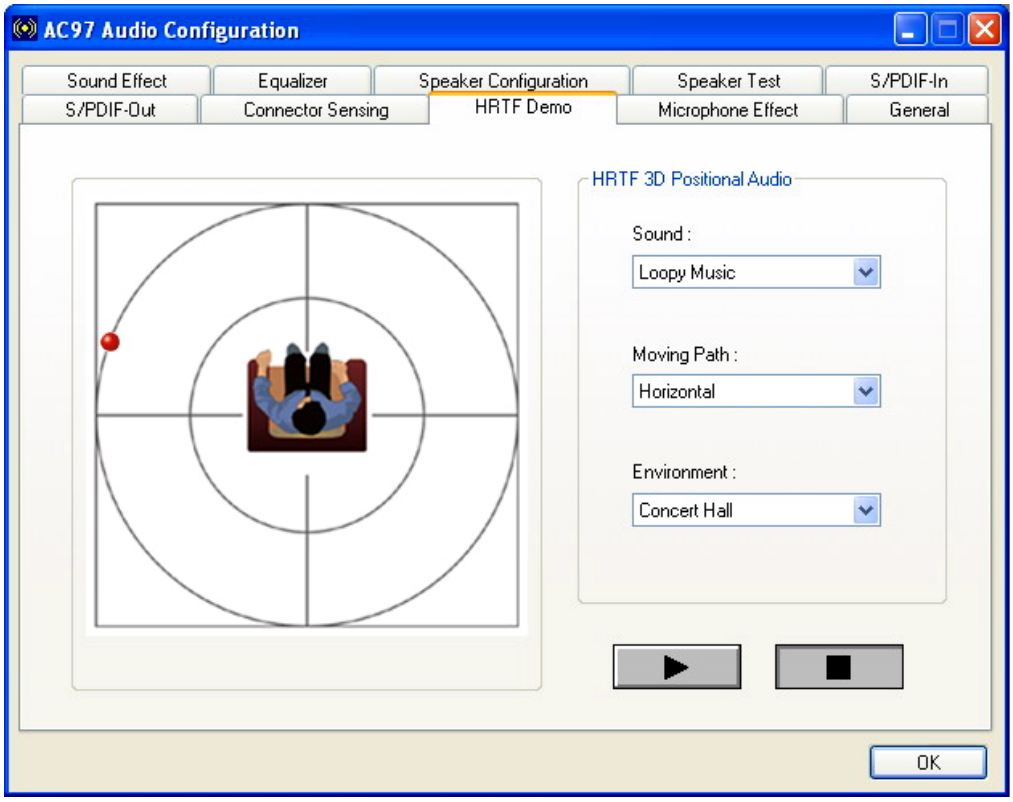

Figure E-15: HRTF Demo

The HRTF window in **Figure E-15** allows you to adjust your HRTF (Head Related Transfer Functions) 3D positional audio before playing 3D applications. Select a preferred **Environment** mode and/or different **Sound** and **Moving Path** settings.

E.14 Microphone Effect

This window provides an option, Noise Suppression. Select its check box to enable this functionality.

E.15 General

The general window in **Figure E-16** provides information about this AC'97 audio configuration utility including **Audio Driver** version, **DirectX** version, **Audio Controller**, and **AC'97 Codec**. You may also change the language of this utility through the **Language** pull-down menu.

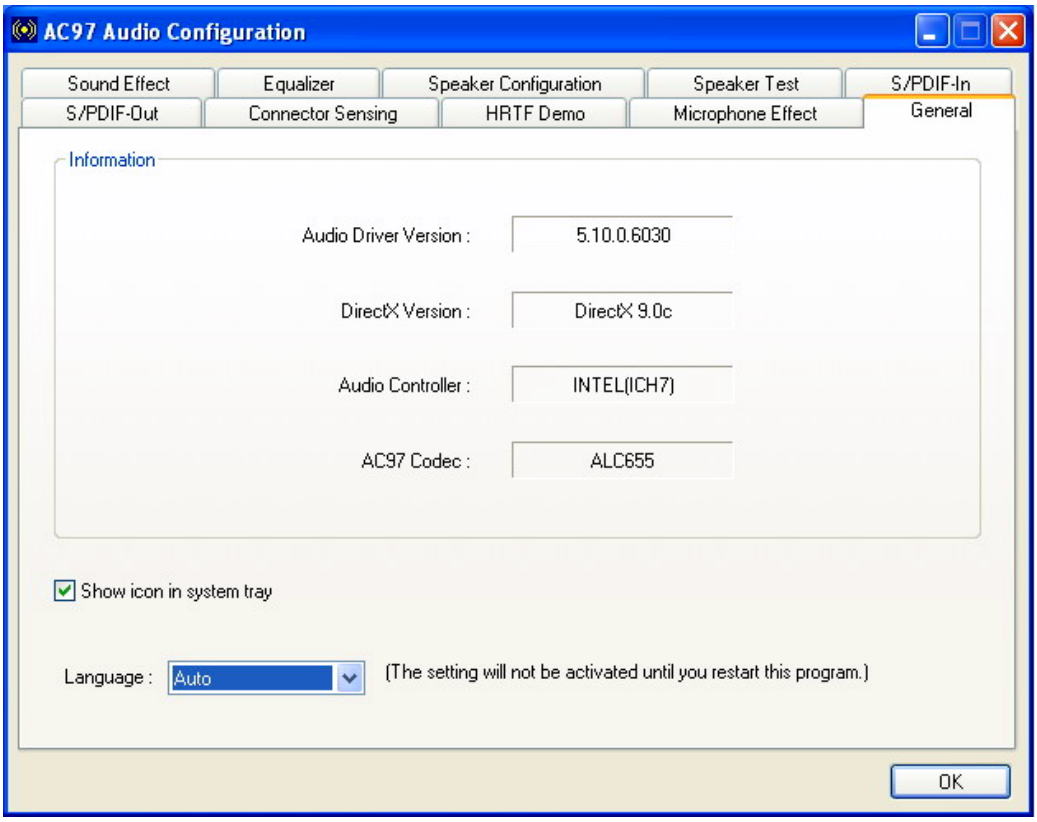

Figure E-16: General

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Product Service

Diagnosis and Debug

CyberResearch, Inc. maintains technical support lines staffed by experienced Applications Engineers and Technicians. There is no charge to call and we will return your call promptly if it is received while our lines are busy. Most problems encountered with data acquisition products can be solved over the phone. Signal connections and programming are the two most common sources of difficulty. CyberResearch support personnel can help you solve these problems, especially if you are prepared for the call.

To ensure your call's overall success and expediency:

1) Have the phone close to the PC so you can conveniently and quickly take action that the Applications Engineer might suggest.
2) Be prepared to open your PC, remove boards, report back-switch or jumper settings, and possibly change settings before reinstalling the modules.
3) Have a volt meter handy to take measurements of the signals you are trying to measure as well as the signals on the board, module, or power supply.
4) Isolate problem areas that are not working as you expected.
5) Have the source code to the program you are having trouble with available so that preceding and prerequisite modes can be referenced and discussed.
6) Have the manual at hand. Also have the product's utility disks and any other relevant disks nearby so programs and version numbers can be checked.

Preparation will facilitate the diagnosis procedure, save you time, and avoid repeated calls. Here are a few preliminary actions you can take before you call which may solve some of the more common problems:

1) Check the PC-bus power and any power supply signals.
2) Check the voltage level of the signal between SIGNAL HIGH and SIGNAL LOW, or SIGNAL+ and SIGNAL– . It CANNOT exceed the full scale range of the board.
3) Check the other boards in your PC or modules on the network for address and interrupt conflicts.
4) Refer to the example programs as a baseline for comparing code.

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Please make sure that the RMA number is prominently displayed on the outside of the box.

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